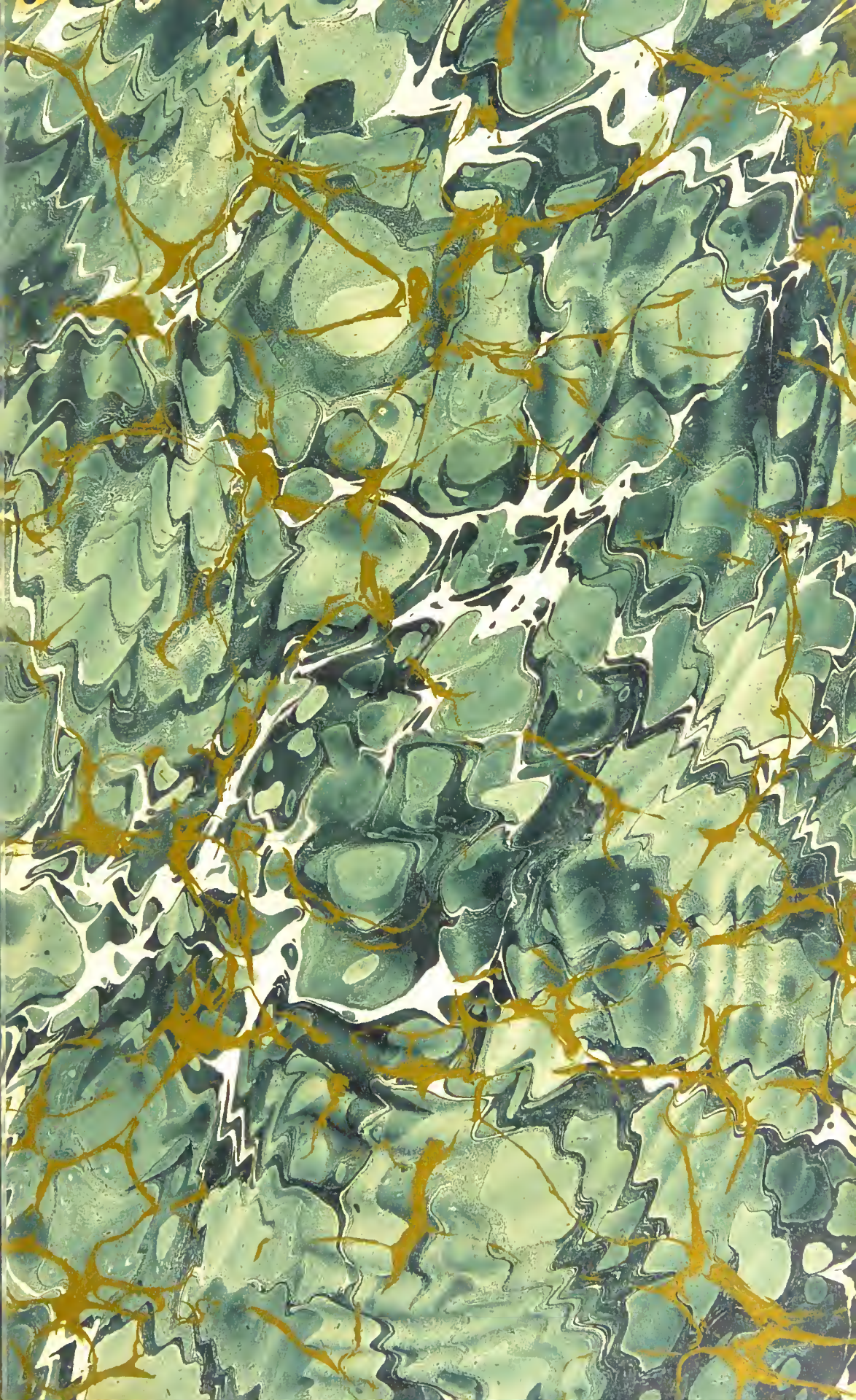


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TO
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PRINCIPLES
OF THE
Treatment of Diseased Joints,

BY
H. O. THOMAS.



LONDON:
H. K. LEWIS, 136, GOWER STREET.

Bernard Roth

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CHAPTER I.

THE PRINCIPLES OF THE DIAGNOSIS AND THE TREATMENT OF JOINT INFLAMMATION, ANCHYLOSIS, DEFORMITY — BONE- SETTING.

No writer on or teacher of surgery has hitherto advanced any consistent theory with regard to the treatment of articular disease, this being perhaps the cause of the very patent fact, that the mode of practice in the cure of joint disease still remains so varied and divergent. Consequently, as soon as a surgeon reaches a position of vantage where he has opportunities for the treatment of unhealthy joints, he almost inevitably introduces a speciality of practice behind which he soon entrenches himself, and from which no amount of reason or evidence is likely to dislodge him. During late years, however, in consequence of a glut of theories and methods academical, all of which on trial only giving results with practical defects, surgeons who have explored other fields have, as the result of their search, advocated the treatment of articular defects by a method of adventure—bone-setting.* Those, who have introduced this phase of practice, seem to have overlooked the fact that bone-setting is only the past treatment of ankylosis as advocated and practised

* Paget, Marsh, Adams, Fox.

by well known qualified specialists. All qualified and unqualified practitioners of this class practice certain flexions, extensions, twists, jerks, and pushes, with passive motions and other details, which they evidently intend as giving proper dignity and importance to their proceedings; the treatment, however, which the sufferer is most in need of he seldom meets with—no motion. The accumulated experience, handed down to us by our predecessors, shows a marked tendency in favour of securing, as far as practicable, the immobility of unhealthy joints, or when soundness of the joint has been secured, non-interference. Up to this date we have not been confronted by either rational argument or practical evidence, which appears to me to support the recent attempts to discredit as well as reverse the teaching of our predecessors. If the surgeons of the past did possess less knowledge than our contemporaries, still they were not so much astray from the true theory of the treatment of articular diseases as those surgeons who, during late years, have tried to make a special place in surgery for the treatment of ankylosis, by what is popularly termed bone-setting. It is impossible to illustrate the principles proper to the treatment of articular disease without discussing under this term, as mere gradations of joint disease, inflammation, deformity and ankylosis.

It will probably make my argument more easily understood, if I define what I mean by such terms, as “healthy joint,” “inflamed or diseased or unsound joint,” “ankylosed

inflamed or diseased or unsound joint," "anchylosed sound joint," "sound joint," "deformed joint, or avoidable practical defect."

A healthy joint

Is one, the radius of action of which is equal to the radius of a similar joint in the majority of people, though not equal to the radius of some exceptional examples. Again, it is one that has never been the subject of inflammation, and is fitted for the daily weight and friction attendant upon use, provided that it has the usual interval of repose; this interval being necessary, otherwise inflammation would arise from over use, as we know this mishap to be not an uncommon interruption during attempts at task pedestrianism.

Inflamed joint

Is an articulation, the radius of action of which, in the absence of the practice of more or less immobility, is gradually diminishing. This diminished radius of action, being usually and correctly designated joint-deformity, tends to increase so long as the joint is unsound, and is caused solely by the efforts of nature to practise immobility as a means towards aiding resolution. An inflamed joint may or may not be accompanied by effusion of liquid matter within the capsule, according to the circumstances influencing the joint lesion.

Anchylosed inflamed or unsound joint

Is an articulation in which some signs of inflammation remain, and where there can be no motion detected. This evident absence of motion at the articulation may arise from the want of pliability of the capsule, and its surroundings; or there may be osseous adhesions between the bones comprising the joint, but in an unsound ankylosis, progressive and evident motion will follow use, if the limb, in which the ankylosis exist, is employed for its usual purpose. For instance, if at the commencement of use it be in a practical position, use will cause it to recede from this; or should it be an impractical or defective position, this defect will be increased, no matter what may be the nature of the ankylosis. This fact justifies me in classing all forms of unsound ankylosis as "false ankylosis."

Anchylosed but sound articulation

Is one, the nature of such ankylosis being immaterial, as no trace of inflammation remains; then whether the ankylosis be accompanied by practical avoidable defect or not, ordinary daily use cannot bring on any variation of position, an indication that such condition of ankylosis ought to be termed "true ankylosis."

Sound joint

Is one, from which all traces of previous inflammation have passed away. In evidence of this sound condition and complete recovery there may be noticed, that by ordinary daily use, the radius of action, to and from the position maintained during treatment, is seen to be gradually increasing, no matter in what position the limb may have been fixed during treatment—an infallible sign of soundness and a justification for no further restraint or surgical interference.

Deformed joint.

Deformity of an articulation depends upon the locality. Any amount of flexion—if permanent—at the knee-joint constitutes a deformity, while a condition of permanent extension constitutes a deformity at the elbow-joint. This apparent inconsistency of classification is justified on the ground of expedience and the necessity of securing, during treatment, a posture which will ultimately give the utmost practical use, in case the motion of the articulation should be lost from inflammation, should the inflammation not be sufficiently moderated in degree, nor sufficiently shortened in duration by the exercise of the highest art, so as to avoid ankylosis.

The weakest point in the surgery of joints has hitherto been the fact, that surgeons have not known the true signs of disease, nor any trustworthy test indicating recovery. This hiatus has diverted them in the direction of their present teaching in respect to ankylosis, and what is popularly known as bone-setting; and it explains why even surgeons who had a scientific training have seriously attempted to account for

certain reported phenomena, by supposing a special theory, and to have urged the introduction into surgery of an exceptional method of practice. Further, the fact that there has been hitherto no sure test of recovery, has led to the belief that joints which have been excised are less prone to give subsequent trouble from recurrence of unsoundness. It has always been a favourite argument, that without excision, the diseased joint is the subject of frequent and unexpected relapses; a supposed exceptional peculiarity of inflammation in this locality, whereas the real cause of such relapse, has been the fact that treatment was in past time suspended ere soundness of the articulation had been secured; consequently, relapses would certainly be the rule rather than the exception, as without an unerring test of the condition of the articulation, an opinion, when permission to employ the limb was given, would only be a guessing at the condition present, and the prevalent opinion among us in regard to the course these affections run, shows that in most instances, this guess was seldom accurate. There are two classes of articular defect which the surgeon is expected to exercise his art upon and correct, articulations diseased, and articulations sound but hampered by practical defect and deformed in regard to usefulness. In the condition of diseased articulations we find inflammation with one or more of its gradations, and the accident attendant upon it—deformity. In the class of sound articulations, must be included congenital and non-congenital deformities, not caused

by antecedent inflammation ; also, deformities which are the only remaining indication that inflammation had previously existed.

To the treatment of lesions of the first class, *in desired articulation* there can only be applicable the principle, that the most perfect and continuous practical immobility should be enforced, so long as unsoundness is known to exist. This is a principle to which there is no exception, and from the practical application of which the joint treated cannot suffer any otherwise avoidable permanent defect, that can be shown to be the result of this practice, even though the application of this theory in treatment was prolonged beyond the period of soundness, either wilfully or inadvertently.

ek In the treatment of the second class of cases, there apply principles exactly the opposite of those suitable to the treatment of the first class, as during the correction of the mal-position of limbs in the second class more or less unsoundness must be induced, and means used to maintain this unsound condition, until the wished-for position has been gained, when the principles proper to lesions of the first class must be enforced, and thus a sound joint is regained, and the amended position will become a permanency. A knowledge of these facts enables the surgeon to correct most deformities without having recourse to tenotomy, except during the amending of some deformities in connection with the foot. The two rules here enunciated are incontrovertible and universal in their application and there are no qualifying circumstances that can justify a suspension of either.

The more completely an unsound joint is maintained at rest—if that rest arrests friction and removes pressure—the sooner it will become sound and able to endure pressure and friction; the probability of ankylosis remaining is diminished, but if sound ankylosis results,—the only impediment that cannot always be avoided—and if the rules here insisted upon have guided treatment, such ankylosis ought to be accepted, not as evidence of defective treatment, but rather as indication of the intensity of the disease. The purpose of treatment should be mainly to avoid these sequelæ, not, as has been the practice in time past, to induce ankylosis, which was often done under the supposition that such a limb was better suited to the wear and tear of use, or that relapse and recurrence were not so liable to happen if ankylosis of an articulation occurred. An unsound ankylosis is quite as liable to retrogression as an unsound joint with motion.

If any person, with a part diseased, possesses sufficient vitality so that there be a tendency to reparation in the diseased locality, then nature always has a mode of operation, and in very many instances the natural method of restoration has become known to us. Indeed the practice of medicine and surgery mainly consists of either aiding or controlling or supplementing this natural effort at resolution, and in these instances where, from experience and knowledge, the method of nature has been changed, the mode not the principle has been supplanted. In opposition to my

theoretical teaching, with respect to the treatment of articular disease, some may raise this objection, that many excellent resolutions of diseased joints have occurred and do occur with but little rest or enforced immobility. This objection is certainly true; yet these cases of diseased joints must have had some degree of rest, for no matter how mild in degree the existing unsoundness may be, no unsound joint ever did or can recover without having first participated in the benefit arising from nature's efforts at controlling more or less the standard range of action of the affected articulation. Even an infinitesimal degree of unsoundness is accompanied by its signs, when there has been recovery without the aid of skilled interference"; even in such a case, from the initial moment of the difficulty, nature at once enters upon its attempt mechanically to aid resolution, by trying to fix the joint. In many mild cases of articular defect skilled assistance may not be sought for, and what is termed spontaneous recovery takes place; but in the intenser degree of joint inflammation the signs of its presence are generally very obvious, and the most prominent and constant of these is that known as joint deformity. It is not only a sign of some abnormality, but is also evidence of the principle and means which nature elects when striving to bring about resolution. Deformity, an inevitable accompaniment of joint disease, is evidence of nature's attempts to secure rest for the articulation by fixation of the joint. This she effects by balancing the dependent or free section of the

limb which enters into the formation of the joint, but as an even balance cannot be maintained, there necessarily follows the condition known as deformity, primarily caused by muscular action. Yet, though we have ample physiological and clinical proof that this unequal action of the muscles controlling the joint is the cause of joint deformity, there are many surgeons who assign as a cause for this, fluid distension of the joint capsule.

An exact knowledge of the cause of the two abnormal conditions, observed in articular disease and known as deformity and ankylosis, indicates the true method of treatment required for these cases. An inquiry into the cause of these two permanent defects informs us that joint deformity is nature's mode of immediate help, and that ankylosis is nature's reserve assistance. The surgeons of the past, in most cases, judged deformity to be an unavoidable defect and ankylosis, as often, a necessary evil; even now the majority of surgeons regard the latter in the same light. My purpose is to try and demonstrate that deformities are avoidable, and that ankylosis is in *no instance* to be desired; though it must be admitted that in the presence of certain conditions it is an unavoidable termination, yet it is always an unmitigated evil; which cannot be said to always arise from improper treatment, as the more efficient the treatment may have been then the less the probability of any ankylosis remaining.

Some surgeons maintain that deformity depends upon intra-articular distension of the joint capsule.* The capsular distension theory advanced as a cause of joint deformity, is based upon experiments performed upon the dead subject, by distending the hip and knee-joints with liquid matter. The facts recorded, as observed during these experiments, are beyond question, but they are not applicable to the solution of the question in dispute. *First*—As surgeons are always invited to treat not dead but living subjects when the muscles controlling the joint are able to, and will actively, intervene, thus a purely mechanical basis of deduction must be fallacious. *Second*—That when the bones comprising the joint have been carefully fixed, so that ordinary motion and tremor are avoided, the muscles in connection with the joint are quiescent, even then deformity does not appear, though some amount of capsular distension may be suspected, or as in the case of the knee-joint can be seen and felt. *Third*—Any surgeon who has had a moderate experience of injuries of the knee, a joint in which nearly all abnormal conditions are so easy of detection, must be able to recollect instances of severe injuries, where there was sudden and extreme capsular distension; yet during the first few minutes, ere the muscles had become cognizant of the mishap, there was scarcely any deformity or flexion. *Fourth*—Knee-joints are not unfrequently presented to the surgeon suffering from liquid distension only, showing no trace of disease, which the muscles appear to

* Bonnett, Dittal, Owen, and others.

know, for there is an absence of any deformity, as there is no special muscular intervention. *Fifth*—Many joints, as those of the fingers, wrist, shoulder, jaw and others, progress through an inflammation without much, if any, liquid distension ; yet, notwithstanding, deformity arises. *Sixth*—That the removal of joint distension by aspiration does not diminish the deformity.

It is my opinion that in the living subject fluid distension of joint capsules does not appreciably determine the nature of the deformity in the joint, no matter which joint be selected for discussion. The advocates of this theory rely most upon the deportment of the lower limb, both during disease of the hip-joint and also when under experimental trial in the dead subject, as evidence in favour of their contention.

Another error has been committed by these surgeons. They have also drawn their conclusions from a very limited clinical observation of hip-joint disease, and have been led to suppose that the general signs of this disease are always to be seen in those cases in which the disease has progressed so far as the condition of supuration. But a more extended experience teaches us that the stage of pus formation within the joint and the subsequent stage of its exit are not always accompanied by uniform symptoms. These facts incline me to the opinion that hip and other joint deformities, accompanied by inflammation, arise mainly from the effort of the patient, by the exercise of his will, to pose the limb in the easiest position and fix the articulation, without which ease could not be gained.

Below are appended, in tabular form, the various types of cases to be met with when a portion or the whole hip articulation is suffering from inflammation.

CASE A.	CASE B.	CASE C.	CASE D.
<p><i>First Stage.</i> Wasted nates, no lameness, but if tested by the author's method slight flexion apparent, and the disease may be resolved, or may progress through the terminating stages of B, C, and D.</p>	<p><i>First Stage.</i> Wasted nates, lameness, if tested by the author's method flexion apparent.</p> <p><i>Second Stage</i> Wasted nates, lameness, flexion, false lengthening, eversion and abduction with or without suppuration, and occasionally slight flexed contraction of the knee.</p>	<p><i>First Stage.</i> Wasted nates, lameness, flexion by the author's test, inversion with or without shortening, adduction and slight in-knee, terminating with or without suppuration, and occasionally slight flexed contraction of the knee.</p>	<p><i>First Stage.</i> Wasted nates, lameness, flexion.</p> <p><i>Second Stage.</i> Wasted nates, lameness, flexion, false lengthening eversion and abduction.</p> <p><i>Third Stage.</i> Wasted nates, lameness, flexion, real shortening, inversion in-knee, terminating with or without suppuration, and occasionally slight flexed contraction of the knee.</p>

Deformities in connection with the hip-joint are explicable by no other assumption than this, that they are mainly caused by muscular action acting under the direction of the sufferer's will, as it is otherwise impossible to account for the four distinct variations of deformity that are to be met with. The various signs attendant upon hip diseases can not be accounted for, by the capsular distension hypothesis, or by a consideration of the reflex action of the nerves distributed to the joint and its appendices or of nerves distributed to separate integral parts of the hip, though it is probable, that when the muscles, which control an inflamed articulation, are exerting their power to fix and give rest to an articulation, reflex nerve sense is also operative in some degree.

Some surgeons have taught that the action of muscles in connection with a diseased joint is a hinderance to recovery, and consequently have advised that some of them should be disconnected from their control of the joint by the performance of tenotomy. The muscles which they supposed specially to thwart recovery are the flexors. If the supposition that muscular action aggravated the disease were true, then the section of either the origins or insertions of muscles controlling a diseased articulation would be proper, and to carry out this consistently all such muscles would have to be severed, as the extensors intervene though not so powerfully as the flexors. This practice would thwart the natural method of resolution of articular disease, and if no efficient aid from art was employed, the disease would rapidly progress, from the extra friction of the diseased surfaces that would inevitably follow. My contention is and has always been that, if the articulation is fixed more efficiently by art than by the natural method of muscular action, then it follows that muscular action cannot operate, except in a degree which can be practically ignored, as the lesser force cannot exceed the greater, muscular action becomes inoperative, which is demonstrated by the observed fact, that the more efficient the control of the articulation, then the quieter the muscles become. Indeed a thorough fixation of diseased joints is a physical method of physiologically suspending or disconnecting for a time muscular influence from a joint, and this inhibition of muscular interference will be the more complete, just in proportion to the practical efficiency of mechanical aid.

The principles, which ought to guide us in the use of means towards bringing about the resolution of articular disease, are equally applicable towards ensuring the articulation from practical deformity, and the same principles, if they guide the treatment, they should also diminish the prospect of the defect known as ankylosis. Modern surgeons hold various opinions as to the causes of articular deformity, but they are nearly unanimous in their conclusion as to the cause of ankylosis, although there appears to have been in the teaching of our predecessors some divergence of opinion in regard to the causation of ankylosis. But my contemporaries have contended confidently and almost unanimously that ankylosis is caused mainly by the temporary suspension of the habitual function of the joint, especially the suspension of motion, and during the past twenty years they have made, what are in my opinion, futile attempts to carry their views out in practice, by permitting during treatment friction, a greater evil, while they try to suspend pressure, a lesser evil, a mode of treatment much inferior to the natural method, as the latter in principle is a method in which the arrest of friction is mainly intended and nearly attained.

The natural mode of bringing about the resolution of an inflamed joint, though excellent in principle, is obviously not so efficient in practice as some art procedures. Its obvious defects are—*First*, the muscles, if permitted to control an inflamed joint, subject the articular surfaces to some

degree of increased pressure, enough, if sufficiently long and uninterruptedly continued, to seriously damage the articular cartilage, even though there be no disease. — *Secondly*, the muscular, or nature's ready method of fixing an inflamed joint, is inefficient, in that by it the diseased joint is never held truly immovable. Taking the knee-joint for example, we find that at the commencement of the inflammation the angle at the deformity is a very obtuse one, and it becomes gradually smaller as the disease progresses, diminishing so slowly that it may continue to decrease for many weeks, or even months in some cases, ere the range of action of the superior muscles has been reached, when further change becomes impossible. Though the variation of the angle at the deformity increases very imperceptibly, still this slow progress is sufficient disquietude to thwart the recovery of the joint. There is clinical proof of this in the fact which has been observed, that if an inflamed joint is surgically controlled, fixed immovably to a base line, and if at certain intervals of time, the line of support is varied, it will be seen that resolution is delayed. Indeed, in many instances, this has caused the disease to progress, but, as soon as the limb was retained immovably and uninterruptedly, progress to recovery was resumed.—*Third*, ankylosis or nature's supplementary aid towards inducing the resolution of articular inflammation is open to the objection, that when it is no longer of any assistance traces of it may remain, which may

partially or totally interfere with the normal extent of motion of the articulation. While the joint inflammation lasts ankylosis is of service, as it is an aid and one of more unvarying character than the method of fixation by muscular control. Ankylosis prepares to fix the joint, when the method by muscular control begins to fail, either by exhaustion of muscular power from too continuous action, or when the limit of action in the superior muscles is arrived at, and consequently muscular control of the diseased joint becomes much lessened ; but after ankylosis has been of service in bringing about resolution, the altered structures constituting this condition may remain or become a permanency, which, besides interfering with the action of the joint, will also hinder the re-development of muscles in connection with the now sound joint. During nature's attempts at the repair of fractures, a similar defect is to be observed, the provisional or ensheathing callus sometimes remains, though in the case of a fracture permanency of the ensheathing callus detracts more from the artistic appearance than the usefulness of the result. In the majority of cases the defects attendant upon permitting an inflamed joint to run its natural course to recovery, can be avoided by supplanting the natural method by surgical interference. The armamentaria of surgery is now stocked with means that enable us to totally neutralize muscular intervention which also much reduce nature's tendency to the construction of ankylosis, so that ankylosis of a permanent character shall be an improbable termination after resolution of inflammation

in a joint, just as modern surgical appliances have enabled us to almost totally hinder the formation of the ensheathing callus, so often to be met with in past times, during the treatment of fractures.

The term ankylosis always refers to some abnormal condition of the joint or its capsule, a condition either attendant upon inflammation of the joint itself or on extra-capsular disease close to the articulation and sometimes collaterally affecting the capsule. These conditions induce various alterations of normal structures and also adventitious formations, as for instance, extra-capsular fibrous adhesions, intra-capsular fibrous limitations, contraction and thickening of the capsule and osseous union of the articular surfaces. A stiff joint is not an ankylosed one. A joint may be stiff and yet truly normal; between a stiff joint and an ankylosed joint there is no analogy beyond the absence of motion, a symptom that does not justify these two conditions being brought into relationship. It has hitherto been the practice for surgeons to divide ankylosis into two classes, true or bony ankylosis and fibrous or false ankylosis, a structural classification, but it is my opinion that the expressions false and true ankylosis should refer to the permanency of the rigidity, not to its structure; that is, no ankylosis which will vary either by test or use should be termed true ankylosis, and no ankylosis which remains immovable by either test or use should be termed false ankylosis. If this classification, which I conclude is the natural one, were accepted, then it would follow that all

unsound joints with complete or some arrest of motion would have to be placed in the class of false ankylosis, no matter what amount of rigidity were present, for so long as false or unsound ankylosis lasts, there is always a prospective chance of recovery with complete or some motion by use alone, sometime after the soundness of the joint has been secured. Again, all cured joints with absence of motion would have to be ranged in the class of true ankylosis, and for all of this class there is no prospective chance of the recovery of motion by muscular use of the limb.*

As to the cause of ankylosis, our knowledge is as yet very scant. The initial cause is obviously the inflammation present inducing sympathetic irritation in structures connected with, and which form, a perfect articulation. That inflammation is the first cause, is shown by the fact that ankylosis is developed in proportion to the intensity of the inflammation present ; as for example, there may remain permanent or true ankylosis, though the disease was of short duration and never reached the suppurative stage ; or, again, true ankylosis may remain because the inflammation, though moderate in degree, has lasted a long period, its prolonged existence having necessarily the same effect as an intense inflammation for a shorter period has. That reflex action has some influence in constructing some of the changes found in diseased joints, is proved by

* Throughout this treatise I shall follow my accustomed habit, and when referring to true and false ankylosis, adhere to this classification.

the fact that, during the inflammation of a joint, nature attempts and sometimes succeeds in limiting the diseased part of the joint, as has been often observed occurring within the sac in inflammation of the peritoneum.

Tremor is another cause which aids in producing, or making permanent, ankylosis—the joint not being sufficiently fixed by the natural method or inefficiently so by art. Obviously this secondary factor in producing ankylosis is a matter of much surgical interest, inasmuch as it is possible, by anticipation, to prevent this tremor which, however slight, is very injurious, while it is equally obvious that the initial cause of ankylosis must be inflammation of the joint, which can but rarely be anticipated.

The prevention and cure of inflammation of joints and its attendant conditions, first of all demands the nearest approach to mechanical rest, as immediate and anticipatory treatment is of the first importance; then the aid of therapeutics or any item of surgical treatment that may be considered wanting can be used.

There has been, of late years, a tendency in the profession to make the treatment of articular disease and deformities more and more a speciality, and this tendency to specialism has been encouraged by the fact, that in the absence of a knowledge of the true principles of treatment, a large number of practitioners dread the responsibility lest defect remain after treatment, defect being frequently suspected to arise from mal-treatment. From this suspicion no practitioner can

confidently clear himself, primed as we have hitherto been with erroneous knowledge with regard to some of the most important points in the etiology and treatment of articular diseases. There are no principles specially applicable to the treatment of articular disease, which do not apply to all diseases. The archives of both medicine and surgery are almost overburdened with evidence in illustration of what otherwise might have been surmised, that all diseased parts are benefited and protected from serious deterioration by rest. Rest is a remedy that has been unanimously recommended by surgeons as essential to the treatment of articular disease. But rest is also a remedy that has been unanimously judged by surgeons to be attended with drawbacks in practice, as leading to after evils, especially to ankylosis. If this last opinion regarding the effect of rest in the treatment of diseased joints were held in connection with other inflammation, both medicine and surgery, in many instances, could not benefit the sufferer as much as if he were left to take his chance of recovery by a natural method of resolution. Happily, in support of this prevalent dread of rest, there exists no fact—all evidence is opposed to it.

If healthy joints require some rest, surely diseased joints must require much more! Indeed, all that the skill of the surgeon may be able to call forth to his aid.

The treatment of articular inflammation by enforced rest never has been nor ever will be a factor in producing true ankylosis, and it is to me inexplicable that surgeons of

reputed acuteness for clinical observation, have hitherto failed to amend the erroneous teaching, that rest can favour the production of permanent ankylosis. The following paragraphs are examples of the prevalent opinion among surgeons with regard to the supposed evils arising from rest during and after the resolution of articular disease. Their reproduction here will also enable me to better explain my own grounds of dissent from doctrines which I hold to be fundamentally wrong. For instance—

“I need hardly say that it may be sometimes difficult to decide the time at which rest, after having been highly beneficial, may become injurious ; or that the decision is always a matter of grave importance. On the one hand, you and the patient may be losing time through over-caution ; on the other, the risk may be incurred, through rashness, of renewing inflammation in a damaged joint. I believe you will be safe, if you will take the temperature of the part for your guidance.

“The same may be said of joints which have been kept too long at rest for inflammations of whatever kind, still excepting the scrofulous, which should rarely be treated roughly, and never without much caution.”*

These two paragraphs show that surgeons are not acquainted with the method of infallibly testing the condition of an articulation which at some previous time was well known to have been unsound. They also inform us that teachers when advising rest detract from its value. How is it that rest, “after having been highly beneficial, may become injurious” ? “Losing time through over-caution” is not an injury to the lately diseased joint, inasmuch, as when an articulation has become sound, all the causes which tend to produce

* Clinical Lectures and Essays, by Sir J. Paget, pages 97 and 100.

anchylosis have ceased to exist, so that a sound joint cannot become more ankylosed in thirty years than it was in thirty days after resolution of the disease.

In the next quotations are taught the supposed after-evils of rest, when it has been enforced during the treatment of fractures.

“ I have seen such adhesions in the ankle-joints of legs amputated after being long at rest, though the joints had not been evidently inflamed ; and Mr. Butlin* has related a case of anchylosis of a knee-joint in a limb which was long kept straight for the treatment of a fractured femur. But even without adhesions a joint long at rest may become restrained in certain movements by the gradual shortening of all those parts of its ligamentous structures which have been constantly relaxed, and it is likely to be very painful when a strain is put upon these shortened structures to restore them to their natural length.

“ Among the most frequent instances of painful stiffness induced by long rest of unhurt joints, are those of the fingers after fractures of the forearm, and especially after fractures of the lower end of the radius.

“ Another set of instances are those of the tarsus, which, though itself unhurt, may remain stiff and painful after diseases and injuries for which the leg has been long kept at rest. These are not met with, I believe, when the foot has been at a right angle with the leg, as in every such injury it should be. In this posture it will bear, without strain or pain, the weight of the body when walking is resumed.”†

That some contraction in one direction of the capsule of a joint with extension in another, may happen when the articulation has been long confined to a special position is probable ; but this condition of a joint cannot be termed anchylosis nor

* Trans. Pathol. Soc., vol. xxv., page 212.

† Clinical Lectures and Essays, by Sir J. Paget, page 101.

can it be said to be due to the formation of adhesions. Position alone will cause the first, but disease can only be the cause of the latter. Those surgeons who contend that rest can be a cause of ankylosis, point triumphantly to the fact that some joints while at rest during the treatment of a fractured limb become ankylosed, in consequence of the unavoidable fixation of such joints, which the treatment of the broken bone necessitates. But these surgeons ignore another very patent fact, that when such a result has detracted from the value of the cure, the joint, just before or after the bone was fractured, was subjected to some violence, so that traumatic inflammation of the joint followed, and there would be present all the causes which tend to produce more or less ankylosis. For instance, if a femur has been fractured anywhere below its middle, then the knee-joint may present the full signs of inflammation, and may in some rare instances recover with permanent ankylosis; but should the femur be fractured in the upper third, then, though the hip and knee-joints have been subjected to enforced rest, ankylosis is never met with, for the obvious reasons, that they have not been subjected to sufficient traumatic influence to induce any inflammation in them, the first and most potent agency in inducing ankylosis. Again, if we take cases of fractures of the lower end of the radius, the same rule applies, for whether ankylosis is or is not to hamper future usefulness after the repair of the fracture, depends not upon how long the arm is kept at rest, but upon the degree of the violence, which fractures the

radius; in those cases where more or less ankylosis remains after cure, crippling the wrist and fingers, the violence has not only fractured the radius, but also produced traumatic inflammation of the carpal and finger-joints.

My practice has given me many opportunities of verifying this, and I am satisfied that the early removal of restraint in cases of Colles's fracture will not lessen the evil nor shorten the period of recovery, and their treatment by an exceptionally short period of restraint, only tends to there being a long period of unsoundness in the carpal joints, which must increase the tendency to ankylosis. Indeed, in fractures of the radius, recovery with permanent defect of motion at the carpal and phalangeal joints has happened, though there had been no surgical rest employed. As, for instance, when the injury has not been diagnosed nor treated.

Again, suppose the tarsal joints, though uninjured, "remained stiff and painful"; if sound, the stiffness and pain would leave by use, and should these symptoms arise from the tendon Achilles having become contracted because of the retention of the foot in an extended position, then the extended position not rest is blameable.

The following extract is another quotation from a treatise on disease of the joints, and to be found, under the title, "The Effects of Immobility." In it reference is made to certain experiments originally published as evidence that rest may induce serious evil.

"A peculiar change of structure has been much studied by my friend Dr. Reyher of Dorpat. I regretfully refer to his admirable work* for details, being obliged by the limits of my space to renounce quoting his conclusions fully. He experimented by placing one limb of a number of dogs in plaster-of-Paris bandages for a variable number of weeks; the result being that those parts of the cartilage which were out of contact underwent gradual transformation into areolar tissue (*Bindegewebe*), with development of 'epithelioid' cells. This transformation is the same as that which I long ago described as taking place under the synovial processes, and is never combined with either fatty, granular, or caseous degeneration."†

This evidence has been accepted by several surgeons,‡ one of whom has edited a special treatise on the curative effect of rest, as proving that immobility may lead to ulceration of cartilage. How these surgeons could have come to such a conclusion is to me a surprise. Dr. Reyher's experiments do not go to show that immobility may injure an articulation, but they prove that pressure, a mode of motion, by its weight and means of application may so interfere with the nutrition of the joint that it may be seriously deteriorated. Circular compression of a joint cannot rightly be termed rest of that part.

Another surgeon, in a volume specially devoted to the surgery of deformities, referring to my teaching that rest is not a factor in the production of ankylosis, says—

"This idea is erroneous, as long-continued position of an inflamed joint will be very likely to be followed by ankylosis."§

* "Ueber die Veränderungen der Gelenke bei dauernder Ruhe."—*Zeitschrift der Chirurgie*, iii. p. 189.

† Barwell, *Disease of the Joints*, Second Edition, 1881, page 407.

‡ Jacobson's Edition of Hilton on Rest, page 321, 1880. Noble Smith, *Surgery of Deformities*, page 141, 1882.

§ Noble Smith, *Surgery of Deformities*, foot note, page 130.

My answer to this is, that so long as a joint is inflamed the "position" must be continued, and that the length of time should not be considered, as there is no substitute for rest, so long as the disease remains. The same author teaches—

"Any movement which causes pain must be harmful to the joint, but if movement can be made gradually from day to day (without causing pain) adhesion of the inflamed surfaces is interfered with, and ankylosis may thus generally be prevented."*

This extract is excellent advice, if the production of true ankylosis were desired by the practitioner. How can movement of the inflamed surfaces prevent ankylosis? Such practice would prolong the unsound condition, and increase the tendency to produce, by reflex action, inflammatory products, which ultimately become the basis upon which ankylosis is constructed. If this advice were adopted and practised, recovery without defect of articular motion would become a very exceptional termination. This recommendation has frequently been carried out in the treatment of inflamed joints, since the introduction of anæsthetics, as by their use the conservative attempts of the muscles to protect by their resistance, the joint from friction, are neutralized, so that passive motion with other unreasonable and purposeless manipulations are tolerated until the joint becomes permanently ankylosed, or, if it should chance to be a case with a strong tendency to recovery, the cure is only delayed.

* Noble Smith, *Surgery of Deformities*, page 16, 1882.

The cases selected for this unreasonable performance are generally mild ones. The severer cases indicate, plainly, that they require rest ; but even in these cases, as soon as what are recognised as the graver symptoms, become latent, then the treatment becomes of an active and of an opposite character. The usual mode of treatment is that the joint during one stage is aided in its tendency to resolution by rest, but during another stage, that nearer to resolution, if the articulation recovers, it has to do so, despite an interference with its inclination. This mistake of practice can only be credited as arising from the general ignorance of surgeons of any infallible method of testing the condition of the joint. This infallible test-method is described at pages 3 and 4. As proof of how far astray we have hitherto been from the correct principles of treating articular diseases, we need only peruse the treatises written by surgeons who profess to have made these ailments their special study ; in their writings are to be found the greatest inconsistencies. Since my first contribution, some seven years ago, to the literature of this subject, it is noticeable, that later publications relating to this subject have been expurgated from some inconsistencies of teaching, especially in regard to the effect of rest.

As an example of a change of principles and of practice ere the part has recovered, and that upon no other ground than that the grave condition has become less so, the following paragraph is here reproduced.

“In the first stages of inflammation of any joint, rest is also imperative, and, in fact, is the essential element of the treatment; and as long as acute pain is produced by pressing the synovial surfaces and articular cartilages together, rest must be enjoined; or, if motion of the joint is requisite, in order to prevent ankylosis, then this motion must be always accompanied with extension, in order to relieve this pressure. But, when pressure can be borne without pain, and the difficulty in motion depends upon the contraction of tissues around the joint from want of use or from deposits, as the result of an antecedent inflammation, then motion—passive motion—applied with discretion, is just as much a part of the treatment as rest was in the earlier stage of the disease.”*

That much may be written and yet very little known of the principles of the treatment, is proved by the following extract :—

“There are many cases in which the inflammation is so violent, and the pain upon the slightest movement so intense, that *absolute rest* is requisite for a time, and in such cases the fixed dressing alluded to answers a most excellent purpose. Under these circumstances I employ most commonly the cuirass with extension. But *motion* is as essential in retaining a healthy condition of structure about a joint as light is essential in retaining a healthy condition of the eye; for the ligaments around a joint will become fibro-cartilaginous, or even osseous, if motion is denied them, particularly if a chronic inflammation is going on within the joint with which they are connected. It was in consequence of such accidents occurring in several instances that I was led to contrive some plan by which extension could be maintained that would remove pressure from the acetabulum and the head of the femur, and at the same time permit motion of the joint, thereby retaining the capsular ligaments in a healthy condition.”†

But rest is essential to a healthy joint, in order that motion may be tolerated by it.

Of all the glaring errors and contradictions, that are to be met with, in special treatises written on the subject of articular

* Sayre, Orthopedic Surgery and Diseases of the Joints, page 169, 1876.

† Sayre, page 260, 1876.

disease, no publication which I have ever met with, contains statements so irrational and contrary to our clinical experience as are taught in this volume. Indeed, the volume is composed, partly of facts but mostly of assertions, and the latter appear as if intended as counter-blasts to the former.

Here are other extracts showing the same eccentric bias—

“When this instrument is employed, it is necessary that the child should be taken from it very frequently, and have all the joints carefully moved, otherwise too long continued rest of the joints may end in ankylosis. In moving the diseased joint, care must be taken to hold the pelvis, and to make slight extension upon the diseased limb when motion is given to the joint. Perfect rest, long continued, even of the diseased joint is decidedly injurious, as there is danger of its resulting in ankylosis.”*

“On the contrary motion of the joint without pressure is not only not injurious, but it is highly beneficial.”†

“It is also manifest that if permanent ankylosis be the result arrived at by the surgeon, rest must be a necessary condition for bringing it about.”‡

“The recent advances which have been made in the treatment of hip-joint disease by the American Surgeons.

“The first principle is that of extension, as a means of relieving the most acute pain in joint diseases, especially applicable to the knee and hip-joints.

“The second principle is that of extension combined with motion during the progress of disease, the patient being allowed to walk about, so as to promote recovery with free motion in the joint, instead of the ordinary result of ankylosis obtained by long-continued rest and immobility.”§

* Sayre, American Clinical Lectures, page 14, 1875.

† Taylor, of New York, on the Mechanical Treatment of the Hip-Joint, page 15.

‡ Hood, on Bone-Setting, page 113.

§ Manchester Meeting of the British Medical Association.—*Journal*, Jan. 5th, 1878.

All the preceding extracts have been culled from recognised authorities, but from this denunciation of prolonged rest there are some few who are inclined to dissent.

It gives me confidence and pleasure to find, though the general opinion of surgeons, in regard to the therapeutic value of rest in articular disease, be adverse to my own, that I am not totally isolated, for an eminent surgeon, and one to whom belongs the honour of having initiated scientific reform of articular diseases, thus expresses his conclusions as to the value of enforced rest as a curative agent in these lesions—

“*The very first therapeutic axiom* in the treatment of joint diseases is *rest, absolute and unconditional*; and the next, *proper position* of the affected articulation. The efficacy of these two is greater and more reliable than the entire antiphlogistic apparatus, and they generally suffice to meet the exigencies of the first stage.

“IN THE SECOND STAGE the indications of treatment become more diversified. The pathological character of this period is expressed by structural invasions of a more decided nature; by more copious infiltrations and effusions within the joint; by reflexed pain, muscular spasm, and consequent malposition; and, in fine, reactive disturbances of the constitution. If the patient has been properly attended to at the first stage, the disease will but rarely advance to the second; and if the local affection was of a nature that could not be checked in its advance by due precaution, the second stage will be at least materially mitigated by the previous treatment. Assuming, however, that the patient comes under your charge with the full pathological and clinical force of the second stage, the same remedies and appliances commend themselves; for *rest* and *position* are the imperative axioms whilst the disease is in active progress.”*

* Bauer, Lectures on Orthopædic Surgery, pages 277 and 279. 1868.

This is consistent teaching throughout, and one which reason and clinical observation endorse. Why should the principles of treatment be altered because the storm has moderated? Clinical cases have been recorded as woeful instances of the baneful influence of prolonged rest. As for example, a young lady is reported to have remained recumbent for six years, suffering from vertebral disease; at the end of that time "there was not a single joint of the lower extremities which was not completely ankylosed,"* but as this surgeon has left on record evidence† that he could not diagnose the actual condition of articular disease, this case may have been one of rheumatic inflammation of the joints, and consequently, is worthless as evidence of ankylosis from prolonged rest.

There is recorded another case, that of a young man,

"Having been placed by his medical attendant into a fixed apparatus, embracing the trunk, pelvis, and lower extremities, and so retained for several months that, at the end of this time, the diseased hip was cured by ankylosis, and the knee and ankle of the diseased limb, as well as the hip, knee, and ankle of the opposite one were completely ankylosed. In this case there had been no inflammatory action in any joint, except the right hip."*

This case is tendered as evidence, that in "several months" all the joints of the lower extremity became ankylosed by rest only. If this were the correct interpretation of this case, then general ankylosis would be a very frequent occurrence,

* Brodie's, on Diseases of the Joints, page 157.

† Ibid, pages 67 and 68.

‡ Sayre, page 399.

and not, as we know it to be a very rare event. This was a case of rheumatic diathesis, and the termination would, in this instance, have been the same if the patient had not been treated.

Any practitioner of long experience must have met cases with a rheumatic diathesis, where the sufferer's joints—though there was no surgical rest employed—in time became all ankylosed, so that his remaining days were spent partly in bed and partly at the “fireside.” In my own practice, many such cases have come under my notice, and one case in particular, in which every joint in the body was ankylosed. It is true that he had been confined to bed for three years before his death, but if he had been compelled to daily leave his couch, it would have not cured him of the rheumatic diathesis nor arrested the arthritic formations. Long disuse of joints, even without disease, may stiffen but not ankylose the joints of very old persons, but certainly not of young or middle-aged subjects. But, granting this were probable, stiffness is not ankylosis, and stiffness is not a defect that demands the aid of a surgeon, for use will correct it.

The most remarkable case of general ankylosis ever recorded in the annals of surgery is this—

“Observations on an Universal Anchylosis ; by CIT. PERCY, Professor of the School of Medicine, at Paris.

“The author having stated and compared all the cases analagous to that of which he gives an account, remarks, That no case of such a complete ankylosis has ever been recorded in the Annals of Medicine, and that no collection seems to possess so universal a concretion of the bones

as that which is at present deposited in the Cabinet of the Medical School at Paris. The skeleton, in fact, consists of only one piece, though by the removal and the anatomical preparation of it, several bones have been separated ; as, for instance, the *vertebræ lumborum* and *sacrales*, the *os femoris*, and *humeri* of the right side ; but the traces of their having been preternaturally united may still be seen. The back bone is but little bent, the pelvis, however, is considerably prominent, the thigh bone forms an acute angle with the tibia fibula ; the right hand is turned inward, and the left hand outward ; all the fingers are curvated ; the bones themselves are very light, and their calcareous matter is very brittle. The history of the disease, by which this ankylosis was produced, is as follows.

“ Francis Maurice Mercier Simorre was born in the year 1752 ; when he attained the fifteenth year of his age he entered into the military profession, served twenty-one years, and was promoted to the rank of a Captain of Infantry. During this time he made three campaigns in the Corsican war. Having been a long time encamped on marshy grounds, and in a moist and cold atmosphere, he began to perceive an acute pain in the great toes and in the ankles, where the skin was red and inflamed. This affection being taken for the gout, and treated accordingly, the pain ceased, but at the end of some months, an inflammation of the eyes supervened, which was likewise removed by proper remedies. During several years, however, the gouty complaint, and then ophthalmy, affected the patient alternately in the beginning of spring. These two diseases, which returned periodically, having lasted much longer during two succeeding years, the sight of the patient became extremely weak, and he could not walk without the assistance of a guide. In the year 1786 all his joints were at once attacked ; the feet, the knees, and all parts of the inferior extremities began to become ankylotic. Mr. Simorre quitted the service about this time, and retired to Metz, where he subsisted upon a small pension.

“ The disease increased daily, the arms, the head, the vertebra, and even the maxilla inferior were cemented together. The unhappy patient was nothing, according to his own expression, but a living carcase. His sensibility was at the same time very great, as he suffered the most excruciating pains. Four years he passed in an arm-chair, without ever shutting his eyes ; he was afterwards conveyed with much difficulty into a bed, where he remained two years longer, without being able to obtain even a moment's sleep. His posture was sitting, to which circumstance

the situation of the bones in the skeleton is to be ascribed. He had entirely lost his sight, the cornea and the lens *crystalina* being opaque. In the year 1792, the joints which had hitherto been tumid, began to grow less, and the pains were a little assuaged; but there supervened regularly twice a month an erysipelatous inflammation, attended with fever, and an itching, which proved the more intolerable, as the patient could not relieve it by scratching. This complaint resisted all possible remedies. When the ankylosis was entirely established in all the joints, the patient could be better managed than before. He had all his teeth remaining, but was obliged to suck in his fluid nourishment. The incisive teeth being afterwards drawn out, he could receive more solid food, make himself understood, and throw out his spittle. His figure was very expressive and singular, his hair black, and nose aquiline. The muscles of his face were in continual motion; his body was extremely emaciated; during respiration, his sides and sternum did not move; the inspiration was attended with much noise, and the pulse beat 60 or 63 times in a minute; he had no sensible perspiration; his stools were numerous, and his diuresis abundant; the urine shewed no difference from that of a healthy man. When he died he was about 50 years old. On opening the body nothing remarkable was discovered; the left lungs adhered to the pleura, and had some suppurating tubercles." *

This man was never subjected to any method of enforced rest, and in fact, rested no more than is usual, until he had become so ankylosed that movement was no longer possible. In his case even the joint of the inferior maxilla became ankylosed, which could not, most certainly, be attributed to rest or disuse.

Nowhere in the annals of surgery is there to be found proof that rest can ankylose a joint, but there is proof that extra or prolonged exertion will produce at first a stiffness, which, if not corrected by some rest, becomes premonitory of inflammation

* Medical and Physical Journal, vol viii., page 395, 1802-3.

that may ankylose. The stiffness from resting is never more than diminished suppleness of a part which is otherwise normal. In a publication, which contains opinions the opposite to my contention, a striking example is given, which, the author states, was related to him by Professor Flower.

“A man, whose skeleton is at Marburg, was encased by his relatives for twenty years in a space in which he could only sit with his limbs doubled-up, and in which he could have had only very narrowly restrained movements of his joints ; yet his limbs did not become deformed, and his joints retained their normal textures. And many a case of hysterical joint, after being contracted for years, has recovered without any error of shape.” *

The Fakirs of India have joints, which are stiff from prolonged disuse, and, so long as they have no desire to use them, the joints remain stiff, but, as soon as the time of the devotee's vow has expired, the function of the joints is gradually restored by use, though the immobility had, through the vow, been maintained for a period of twenty years. †

No amount of rest without disease will produce ankylosis, which is a serious defect ; but rest may stiffen a joint, which is a trivial and only a temporary hinderance. The description, which all surgeons have given of ankylosis, informs us that it is a condition where something abnormal has been added to, or taken the place of, the normal structure.

* Sir James Paget, *Lectures and Essays*, page 213, 1879.

Little, on *Ankylosis and Stiff Joints*, page 31, 1843.

Rest cannot produce this, but it may be argued that rest may deteriorate the joint and its surroundings. Supposing this objection were true, rest would not give rise to ankylosis, and from the universally accepted description of this evil, it would be irrational to expect that it could do so, and surgical experience confirms this deduction. For instance, we never find in deformities, congenital or non-congenital, either additions to, or substitutions of, the normal structures, but rather contracted structures and variations in form both of the ligaments and capsules of the joints, while the joints themselves are supple, though not possessing so great a radius of action as in normal limbs. Nay, we have examples even of joints long disused and suffering from defective nutrition, yet possessed of too much motion. There are cases, for example, of non-congenital palsy of the extensors and flexors of the ankle in the young, and known as *Talipes Calcaneus* and *Talipes Equinus*. Again, paralysis of the whole upper or lower limbs, thus disused for years, are to be met with in youth, yet the joints of these extremities are too supple. These cases show also that diminished nutrition which prolonged rest may tend to, does not favour ankylosis. Partial paralysis of a limb may so interfere with muscular action, that the movements may be impeded in the joints, which never become ankylosed, though the limited movement appears to simulate this defect, and, also from unequal balance of the motive power, there may remain permanent simulation of ankylosis.

If pure and unalloyed rest could be secured for a diseased articulation, there would be no attendant evil to lessen its value as a therapeutic agent. If a limb could be placed in practical form on a surface of corresponding shape and could remain on this permanent surface, without restraining tethers, there would be unalloyed rest; but this ideal rest for a diseased joint cannot be obtained in practice, consequently, it would not be correct to contend that enforced or surgical rest is not accompanied by some drawback. Yet even a temporary release from surgically enforced rest during the existence of any disease in a joint would not mend, but aggravate all the attendant evils. By the intervention of surgery much rest can be gained. The best modes hitherto known to us are by no means perfect in practice, for, whilst they give nearly perfect physical rest, they induce some physiological disturbance simulative of disquietude.

Surgeons, when they have decided to secure rest for a diseased joint, adopt one of two mechanical methods in use for the purpose of articular fixation. By one method the joint is made rigid by attaching controlling appliances to the sound portions of the limb, to which the diseased articulations belong, and, in principle, this corresponds to what we observe in practical medicine. The remedy here gives relief to the unhealthy portion of the body by its action on the healthy portion. By the second method, the restraining force is applied to the diseased part alone or to

the sound parts as well, but whichever plan is adopted the principle is the same, inasmuch as the diseased area is subjected to pressure. My opinion of the latter method is that in many instances it must promote the progress of the disease as much as, if not more than, the absence of enforced rest would do. It may succeed in cases where there is a strong tendency to recovery, but when the tendency is in the direction of retrogression, enforced rest, secured by such mechanical means, sometimes hinders but oftener promotes, by its pressure on the diseased locality, the progress of the ailment.

A mechanical treatment based on the principle of the first method is, in my opinion, the proper one in cases which require all the resources of art with the least amount of attendant evil.

Perfect or true rest, if it were possible to attain it, would never be followed by true ankylosis in cases where there existed no special tendency to this condition, which is a sign of a special diathesis. Permitting the patient to recover by the natural method of fixation makes ankylosis a probable termination. It matters not what principles of mechanical treatment be adopted, the best of them is not wholly free from a tendency to promote ankylosis, though the superior mechanical method reduces this tendency so much that it becomes of only slight practical importance. Diseased joints, when treated by the second mechanical method of restraint, are always long delayed in the unsound condition, and even when

they improve they remain long hampered by some degree of false or unsound ankylosis. These are the cases that finally go to swell the records of either excision or amputation. It must be admitted that, no matter which of the two principles of mechanically fixing a joint be followed, ankylosis may remain, but, by the first method of mechanical fixation, the result, if any, will be true ankylosis and by the second it will probably be false ankylosis,—a difference in quality and a very important one.

To further illustrate and justify my preference of one mechanical method over another, I will sketch a few ideal cases of diseased knee-joints, with the mechanical treatment usually followed under similar circumstances in actual practice.

Case A—Is suffering from injury to the knee-joint, followed by effusion of liquid within the capsule, accompanied by pain, some degree of flexion, and debility of the limb, these indicating an infinitesimal amount of inflammation. The treatment adopted, towards restoring the articulation to the normal state, is fixation either by encircling the joint with some material which gradually becomes rigid, or by a posterior support placed behind the knee, which is retained in position by a bandage which encircles the joint.

Case A, recovered rapidly and perfectly, both the attended and attendant being very well pleased with the progress and result, especially, as it was not a trivial injury. But the method is certainly not the most excellent practice, though it is the common one, in traumatic lesions of the knee-joint, and is, indeed, that which it is my own habit to adopt in many such

cases. This case is an illustration of the use of mechanical means for securing rest, by applying restrictive force, partly to the injured and partly to the uninjured area; and, as compression of the injured area is employed, the question properly arises, "How do these cases recover, if they are fixed at rest by a mechanical method, not strictly correct?" The explanation is, that the arrest of friction and tremor, combined with a strong tendency to natural resolution possessed by the injured part in this case, outweighed the obstacle to resolution from the force of the circular compression of the abnormal area.

Case B—The practitioner is called to attend B, and finds him suffering from an attack of general rheumatism, many joints having been invaded by rheumatic inflammation; several of his joints recover perfectly, with no mechanical control beyond the natural or muscular one, but one knee-joint lags in its progress to recovery; then the same mechanical method, which was followed in the case of A is applied, and now progress towards a cure is hastened, and the patient gets well, despite the fact that the mechanical method of fixation involved in its application compressive force.

Case C presents himself to the surgeon, suffering from what the patient authoritatively informs him is rheumatic inflammation of the knee-joint, and mentions, as the grounds for his diagnosis, the fact that, some two years previously, he had suffered from an attack of rheumatic fever, and that at the time of his illness other joints which were affected had perfectly recovered, but that the knee-joint now shown to the surgeon had remained painful, flexed, and feeble, though it had been well attended to,—remedies, therapeutical and mechanical, having been made use of. On manipulation, the surgeon cannot detect any liquid in the joint nor any enlargement of its surroundings. An examination of the patient's constitutional state does not reveal any trace of a rheumatic condition, as there is no such constitutional taint to be suspected as existing now, although rheumatism was

the original cause of the present unsound condition of the articulation. The surgeon comes to the conclusion that the mechanical method hitherto applied in the case must have been inefficient ; because the joint, though delayed in recovery, has not much retrogressed. The surgeon, on inquiry, finds that the method of mechanical fixation previously employed was defective in two ways, first that the support had not extended over a sufficient area, and secondly, was combined with compression of the stubborn articulation, *i.e.*, that the rigid basis attached to the limb by bandages did not extend under the whole length of the limb, thus much available rigidity was lost, and the retentive bandages were applied over both the sound and unsound portions of the extremity. These facts influence the surgeon to try, after the deformed condition of the joint has been corrected, to induce a progress to resolution by supplying the first omission and by avoiding the last evil, which he does by extending the basis of support, and, when attaching it to the limb with a bandage, by encircling only the sound portion of the extremity above and below the unsound joint. This method of fixation is continued uninterruptedly for two years, during which time the false ankylosis passes gradually away, although it has been continuously fixed during the whole time. At the termination of the two years, the surgeon decides, after observing the gradual return of motion, to remove all restraint and try the test of use, and by this he finds that the radius of action in the articulation is gradually extending, until the normal range is attained, and he then pronounces the joint cured.

Case C is typical of those frequently met with, in which the reparative process had come to a stand. The cause of this arrest of progress to resolution corresponds to what surgeons have noticed during the repair of fractures, and known as "delayed union," which is a state of the fracture, in which there is neither a tendency to retrogression nor to recovery, but, so soon as a more artful treatment is employed, the progress to repair starts and continues until the fracture is consolidated ; so in this case a more efficient securing of rest enables the progress to resolution to be resumed in the

diseased joint. My previous statement, that the best known method of mechanical fixation is not without some defect, is possible of demonstration. For instance, even compression of the sound parts of the limb above and below the diseased articulation induces some slight physiological interruption or stasis of the circulation in the parts surrounding the joint, and in some cases, will tend to false ankylosis of the joint, and possibly, in very rare cases, to produce true ankylosis of the articulation ; yet, to set aside all fixation, or adopt some other principle of fixation, would certainly not lessen but increase the probability of permanent defects. Even when the importance of fixing the basis of support, by attachment to the sound portions of the limb has been recognised, the mode of doing so is also a matter that has to be well considered. For to reduce to a minimum the defect attendant on the best method, the basis of support should be made greater in diameter than that of the limb, the encircling bands can then only exert their retentive force anteriorly and posteriorly, thus allowing a free lateral circulation, which will much diminish the tendency, that otherwise would exist, to the production of physiological stasis in parts surrounding the joint. The drawback attendant upon adopting this mode of fixation is more prospective than immediate, that is, it cannot delay nor hinder resolution. Some degree of stasis of the circulation, in parts surrounding the diseased articulation, is instantly beneficial ; like the provisional callus of a fracture, it acts as a very gentle

and an even circular support to the joint, without exerting any intolerable or injurious compression.

The three suppositious cases A, B and C, resemble those to be met with in practice, in which there exists a tendency to recovery, — strong in A, less in B, and least in C,—but other cases are to be met with, which neither of these three ideal cases portray, cases with more or less inclination to retrogression of, the disease; for instance, cases with a faulty constitutional diathesis. In such cases the initial cause becomes a matter of much importance to the surgeon, in influencing his prognosis. If the patient can give a history of, or if the surgeon has grounds for suspecting, a traumatic cause for the present disease, he will probably judge the case, considering the constitutional state, to be one with only a slight tendency to retrogress, and that, if efficient mechanical aid be applied, some progress towards resolution may be started, though it may be a slow one. But in those cases, where, along with a constitutional defect, the malady has appeared without an extraneous acting cause, it may often happen that, no matter how efficient the fixation may be, rest will only give ease and reduce symptoms. For retrogression may continue, though very slowly, as the patient's constitutional diathesis, the original cause of the local mischief, reduces the local lesion to the rank of a mere symptom indicative of the general condition of the patient's constitution, which in some cases may form an unsurmountable obstacle to the

ultimate restoration of the joint, or conservation of the limb. These are the cases with much tendency to retrogression and, from this class of cases, the bill of mortality in diseased articulations is compiled.

Those cases of articular inflammation, with only a slight tendency to retrogression, are such, that through possessing a faulty constitutional peculiarity, if the origin of the disease has been traumatic and if they fail within a certain period after such injury to secure the aid of the utmost practical immobility, the disease progresses and finally goes to swell the statistics of excision and amputation.

No matter what may be the primary cause of the disease in a joint, whether it has been induced by a traumatic, strumous, rheumatic, syphilitic, or gonorrhœal incitement, in its treatment rest cannot be dispensed with ; for if surgery does not step in and apply one of the two methods by which it can secure rest, nature is sure to intervene by the muscular method.

Whatever defect remains after the resolution of articular disease, it never can be shown to be due to the efficiency with which means were applied to gain rest or to the duration of rest. On many occasions it has fallen to my lot to have been consulted by persons, who had been incommoded by sound deformities which had existed during periods varying from five to twenty-six years, and which in one case had lasted thirty-five years ; and although these joints had been fixed at rest by muscular contraction and by alterations in the form of

their capsules, so that there was only slight perceptible motion, yet, after treatment that placed the limbs in a practical form, and after the lapse of time and use, motion was regained, though not up to the normal range.

In the preceding pages are given my views in regard to the importance of rest as a *remedy* for articular inflammation. In this volume, it will be supposed that the reader is qualified to prescribe therapeutically, should the patient require the correction by medicine of any constitutional fault. These are details which I have purposely omitted, as my intention has been to reform those parts of the treatment of articular lesions, which appear to me to be wrong and capable of improvement: a contribution to, not a manual of, the treatment of these diseases, as I have before asserted.

The treatment of articular lesions, up to the present date, has often failed from the want of a trustworthy test of the condition of the articulation. The surgeon might secure for the joint very efficient and long rest, with such a result that he concludes that a cure has been effected; but ere long, signs appear, which he construes as being a return of the disease, and he begins to look upon the case as one of articular disease of an intractable character, and perhaps regrets that he had not counselled excision at first, mistaking again this operation for a "Royal road" out of the difficulty. For many cases of excision go wrong from want of the same knowledge, on the part of the attendant, of this test

which will show the condition of either an excised, or of a diseased, articulation. The signs, which the surgeon ought to observe and weigh, when he desires to come to a decided conclusion as to the soundness or fitness for use of an articulation, are identically the same as those indicative of the progress of the disease, when left to the natural method of resolution, but in reversed order of symptoms ; that is, if the articulation during the acute condition has not been damaged, then, although the limb has been retained at rest during treatment, motion at the articulation may be observed to be gradually increasing ; or should the normal joint structure have been much altered, then, if tested by a period of use, there would be no alteration of the form in which the limb was held while under restraint. This positive result, following after from testing of the joint indicates the absence of special intervention by nature, but a negative result, informs us that when art is withdrawn, nature immediately re-occupies the field from which she had been ousted by the surgeon's skill.

The advantage, that accrues to a surgeon from certainly knowing the proper condition of a joint previously known to be diseased, is very obvious ; he will be able to inform the patient with certainty of his condition, and avoid the mistake of supposing that the joint is sound when not so, or that the disease has a tendency to relapse, "intractable in character." By following the method of testing here laid down, the surgeon can know that the inflammation in the joint has or has not been cured.

It is my practice, when treating a diseased articulation by enforced rest, never to test for the existence or probability of motion, so long as resolution of the disease is not seemingly established, that is, while the disease is obvious. This is the proper policy to follow, for the following reasons :—*First*—So long as the unsound condition obviously exists, there may be very perceptible motion, but it may be lost by the time resolution has been established, *i.e.*, false terminating in true ankylosis. *Secondly*—During the unsound condition there may be very slight or even no motion perceptible, but when resolution has been secured, motion may be acquired, *i.e.*, false ankylosis ending in complete motion. *Thirdly*—Any knowledge with respect to the mobility of the joint during the unsound state, aids neither diagnosis, prognosis, nor treatment. *Fourthly*—If a practical form of the limb has been maintained during treatment, and if that treatment has been proper, then motion will be restored to the joint, if the restoration of motion be possible; but if the articulation has become truly ankylosed, then this termination was an inevitable accompaniment of cure. No matter what the information may be, that is gained during a physical examination of an unsound articulation, rest, the first principle of treatment, cannot be set aside. But should the articulation be so far recovered, that it *appears* sound to the surgeon, and if the patient confirms this by his expressed feelings, the articulation should be put to the test by use. This test soon shows us whether the articulation is genuinely sound, or has only appeared so. This test will also

show whether true ankylosis is to remain and detract from the cure or, with restoration of health to the joint, that motion also has been regained.

As a general rule, one month of uncontrolled use of a limb by the patient, will give the required information; some cases take more, some less time than here specified. During, or at the termination of, the test period, the physical condition of the limb in relation to the joint must be noted and then interpreted by the infallible test-rule previously laid down in this volume, — page 4 — under the definitions of “sound joint” and “ankylosed but sound articulation.”

For successfully treating all degrees and phases of articular disease, the surgeon must possess an unbounded but intelligent confidence in the efficacy of rest as the foundation of all treatment; and, next in importance, he must accept what is described in this volume, as an infallible test of the progress or resolution of the disease. This method is not an ideal one, nor a rule made to meet a demand, but is merely a conveyance into print of that which has been hitherto uninterpreted by surgeons, though the information has always been openly tendered to us by nature. There are, in general use, other mechanical means employed for the treatment of diseased articulations; for instance, counter-irritation, shampooing, passive motion, and electricity. To the surgeon, who has mastered the principles proper to the treatment of inflamed joints,

these terms can convey no useful meaning, as the operations which the terms imply are used with intent to secure an end, which he would see they cannot possibly aid in obtaining.

By acquiring a knowledge of certain principles essential to the successful treatment of articular disease, any surgeon, possessed of ordinary intelligence, may correct articular disease, though he may have had no previous experience in this department.

This observation equally applies to the correction of the conditions known as deformities of limbs, whether they be congenital or non-congenital; and to the correction of deformities again, there appertain certain hard and fast rules, by attention to which no special experience is required, as some surgeons would have us believe. These rules, if attended to, enable the recently fledged practitioner to outstrip his predecessors in the field, no matter how long or how extensive may have been their opportunities, if they should be ignorant of, or ignore in practice, certain principles. Now that mechanical adjuncts for carrying out practically, that, which is theoretically proper, can be secured at a market price of a shilling instead of the guinea, which in past times had to be invested, all practitioners are independent of the costly tackle pertaining to specialist and endowed institutions.

Deformities are usually divided into two classes, congenital and non-congenital, a classification based upon the period of life in which they may happen. This arrangement is of no

practical utility. In my opinion, the best mode of classifying deformities would be to range them under two divisions—deformities sound and deformities unsound. This would point out both the condition of the deformity and the treatment needed.

During the period occupied in correcting deformities, the principles applicable to the resolution of articular disease must be practically reversed, unsoundness must be induced, if not previously in this condition. No sound deformity can be corrected without the induction of more or less unsoundness,—a deviation from the condition of health in the locality which the surgeon wishes to amend. But should the locality which influences the deformity be already unsound, and if its correction succeeds, during the treatment some increased degree of unsoundness must have been induced, even though the most gentle efforts in the direction of amending the defect had been used. But as soon as the wished-for result has been achieved, the principle proper to the treatment of diseased articulations requires to be practically carried out, and then the improved joint or altered osseous junction requires to be treated for a time, as though it had been originally a diseased articulation, no matter what may have been the first condition of the parts giving rise to the deformity.

The structures, maintaining the permanency of a deformity, are first the fibrous expansions which radiate from the tendonous origins and insertions of muscles, and connecting

the true muscular structure; also alterations in the form of, and around, the articular capsule, or if there has been formed an osseous connection between the bones comprising the joint, this becomes another factor in maintaining the defect.*

In all cases, except where the joint has become a mere osseous junction, permanent contraction of the muscles, is the main obstacle to the restoration of a limb to a useful form. But all deformities are not accompanied by permanent contraction

* Writers on the subject of Orthopedics continually make use of the terms "contracted muscle" and "contracted tendon," in such a manner that, in the absence of information to the contrary, their readers can only conclude, that the two terms describe a permanent and actual condition. The word "contracted muscle" is a misnomer,—a shortening of true muscular tissue, from long continuous action, does not occur. The contraction and shortening of the true tendon from long and continuous extensile force is impossible. True muscular tissue can act continuously and effectively, until the divergent fibrous tissue becomes permanently shortened, when the true muscular tissue becomes quiescent. But a healthy tendon cannot vary, certainly not shorten, no matter how long it may be subjected to strain. Neither true muscular nor true tendon structure, so long as they are not diseased, can be shortened or lengthened. But that they may by a special method of procedure while in an unsound state be altered, I propose further on to demonstrate. But this is treatment not the etiology of deformity. During the action of true muscular structures, the divergent ramifications of the fibrous structure, which, converging from the true tendon, become wrinkled, and if the true muscular tissue remain long and continuously active, the folds of fibrous tissue become obliterated, and when the true muscle is tired out the contraction of this tissue acts to mechanically fix in a special position, the part subjected to the control of that muscle. We have, in favour of this theory the fact, that the muscles possessed of much divergent fibrous tissue and extending nearly the whole length of the true muscular structure, are generally the most prone to permanent and very obstinate contraction; as, for instance, the gastrocnemius and soleus, while much permanent rigidity of muscles is seldom met with in such muscles, as the sartorius, which possesses but little fibrous material beyond its tendon of origin and insertion. We have further evidence, in another fact, that the true muscle of a tendon, that has been severed, will resume duty in a few days; yea, if the state of the divided tendon would permit its being safely used, resumption of muscular action would take place, in some instances, very early. Again, if the condition of the muscle itself or of the true tendon was that of contraction, then section by elongating of them would make the resumption of muscular activity a still greater improbability,

of muscle. There are to be met with, deformities which arise from pure over-extension of muscle, without any contraction of the opponent muscles, but examples of this kind are rarely met with. In all treatises on the treatment of articular deformity, much attention is drawn, very properly, to what the surgeon can, and ought to do in the way of rectifying a contracted muscle; but the following fact has never been recognised, that the act of the surgeon, while extending the range of the superior muscles, also corrects the elongation of the inferior muscles which in some deformities is a matter of great practical importance to recognise,—this admits of practical proof.

There are three operative procedures applicable to the correction of deformity. *First*—The procedure by close interference with the hinderance, by means of a cutaneous wound. *Second*—That known as “Brisement force,” or forcible rupture. *Third*—By force, to gradually induce at the point of deformity more or less of unsoundness; or, if the part required to be modified, be already unsound; this condition is aggravated, until its unhealthy tone is further deteriorated, so that it enables the force applied by the surgeon to overcome the resistance to the required alteration. Although, these three procedures are here referred to as distinctly separate, it must be admitted as capable of proof that the first two cannot be successful, without finally going through a stage of more or less unsoundness. The first two procedures are specially

applicable to deformities sound, and they are operations which enable the surgeon to rapidly bring the part, which he may wish to modify, into the condition to which the third procedure is specially proper.

By sketching a few other ideal cases, the reader may be better able to perceive what my opinions are, and in what way they influence practice.

Case D—Is that of a person, suffering from hip-joint inflammation, who seeks the aid of a surgeon, and from his history, the surgeon learns that the disease may have existed six to seven months. On examination of the joint by the flexion method, the deformity of fixed flexion became apparent, the angle of deformity being about 120° ; the other concomitant signs of the disease are also very marked, indicating that the inflammation was very acute. The surgeon decides at once to place the patient in a continuously reclining position, and to fix him to some posterior rigid appliance, of a form corresponding to the contour of a portion of the limb and trunk which were sound. On the first day of the week, the patient is placed by the surgeon in the form and appliance which he had elected to make use of for fixing the joint. The surgeon visits the patient next day, and finds that he has passed a bad night; more pain in the limb, and a new symptom, pains in the loin of the same side as the inflamed hip-joint. During this consultation the patient expresses to the surgeon his fears, that the treatment is not suited to his condition, as the symptoms have been aggravated. The surgeon allays the patient's anxiety by informing him, that as soon as the limb arrives at the plane of the posterior splint, the pain would begin to decrease, and that until the limb began to fall towards the posterior plane, the new symptom would continue and pain might even increase.

When the surgeon visits the patient on the third day, he finds that, though the sufferer has passed a bad night, the pain in neither the loin nor hip is so intense as it had been on the first and second night.

During the surgeon's visit and examination on the fourth day, he finds that the patient has passed a much easier night, and on that day the pain

is not more than the patient suffered from when he first sought the surgeon's assistance. The surgeon, during this visit, applies a test to detect if any deformity remains, and finds that there was scarcely any trace of flexion. After this visit the patient progresses satisfactorily.

Case D, though not a report of an actual occurrence, is, nevertheless, an exact representation of cases not uncommon in surgical practice. During the progress of the reduction of deformity, all the signs indicative of the disease become intensified; this case informs us that more unsoundness has been caused by the procedure. Some surgeons would object to the conclusion that I draw from such examples as case D represents, and might justify their dissent by reference to their own experience, as they had often treated cases exactly parallel to this by the extension method with no fixation, and that they had not specially observed any aggravation of symptoms. My answer is, that the method by pure extension succeeds so slowly, only performing in a month what fixation will do in three or four days, that the signs of aggravation are not so obvious, and that so long as this slow method of reduction is persisted in, no progress to resolution of the disease is made, unless the joint has an exceptionally strong tendency to recovery. But the method of reducing deformity in the direction of a rigid plane ceases to be effective, as soon as the limb arrives at that plane; the storm, which it induces, is severe, but soon passes away. The method by extension, when applied to the reduction of deformity, is one which is operative after the state which it was intended to alter has ceased, continuing to interfere actively not latently, as simple fixation does, though

the storm it induces during reduction is moderate but very tedious. This is its special, and in my opinion, very serious demerit as a surgical aid. The deformity in case D, if treated by reduction towards a fixed plane, would have had the deformity corrected and be far advanced towards recovery, ere, probably, a similar case, treated by the slow and mild method of extension, would have had its deformity corrected,—certainly long before the unsound condition of the articulation resulting from the latter method had begun to pass away.*

The more active the disease and the more prominent the general symptoms, the more rapidly and readily deformity can be reduced. This fact alone, is to me very conclusive evidence in favour of my contention, that the reduction of all deformity must be accompanied by some unsoundness. Healthy structures do not give way without direct interference, and it is well that it is so, otherwise, by the wear of ordinary use, the human frame would assume fantastic shapes.

Case E—A youth aged twelve years, suffering from what his parents assert to be “something the matter with his hip-bone,” is brought to a surgeon for advice, and in answer to the surgeon’s inquiry, they inform him, that some four years previously the boy had suffered from some contagious disease, during the treatment of which he was confined to bed five or six weeks. Soon after he had recovered sufficiently to take exercise, the parents noticed a slight lameness, but they were informed by friends that it arose from “growing pains,” which would soon pass away as he

* Though I have selected the knee and hip-joints for illustration, all my arguments apply equally to any other joints. Theoretically, there can be no difference, but of course the practical application of principle necessitates a great variety in form, to suit special regions.

gained stamina; but, as the lameness very plainly increased, they consulted their medical adviser, who informed them that the hip-joint was diseased and that the joint ought to be placed under suitable surgical restraint. This advice, combined with the term "diseased," being applied to the joint's state, so alarmed them that they sought "further advice," but the advice of the second person consulted, coincided with that of their ordinary attendant. They placed the youth unreservedly under the charge of their usual medical practitioner, who efficiently fixed the patient by surgical control combined with medical treatment, and after the lapse of twelve months the articulation was pronounced cured, and the patient indulged in the games and pastimes pertaining to his age. But after the expiration of another two months, the patient began to complain of a "tired feeling" at eventide, and exactly three months after he had been pronounced cured, he experienced suddenly an acute pain in the hip which extended down towards the knee. The doctor was sent for, and he recommenced his previous treatment, and mentioned the probability of abscess formation. At the termination of another month, the patient had so much improved that he left his couch, but still wore some surgical appliance. His condition for some months, was such that his parents could notice no improvement, and during one of the many consultations they had with their friends regarding the boy's ailment, one friend suggested that possibly the bone was now displaced, and probably had been so from the commencement; he also informed them of a practitioner skilled in reducing such luxations, time and condition being no bar to success. This was welcome news, and to the great city in which the almost infallible practitioner resided the parents went accompanied by their charge. During their visit to the metropolitan notable, they related as well as they could recollect the particulars regarding the youth and his ailment, and the specialist, in response to their inquiry, What he thought of the case? at once replied, that the bone was displaced, and that he would, if permitted, undertake reduction; to this the boy's parents assented.

On the next day, this unqualified practitioner operated, assisted by another qualified practitioner who only gave æther; the operation consisted of putting the lower extremity through certain evolutions. This proceeding induced much aggravation of symptoms, for which, bathing, poultices and embrocations were prescribed, but no benefit arose from the treatment, and some months subsequently two abscesses burst, one in the groin

and another behind the hip-bone. This was the surgical history of the case, and the parents wished to know if the surgeon now consulted, could do anything to improve the appearance and usefulness of the limb, as the heel was many inches short of reaching the ground. The surgeon, on examination, found two sinuses discharging freely, no pain on percussion or jarring the limb, but the youth said that he still felt some slight uneasiness at night, and after much exercise the limb felt very wearied ; general health excellent.

A physical examination of the limb reveals also that there is no perceptible motion possible at the articulation, and that the patient is tolerant of manipulation, but in doing this the surgeon exerted only moderate force. Around the articulation the parts are slightly greater in bulk than the sound one, caused partly from thickening of the trochanter, and partly those structures which cover it and the capsule. After the surgeon had finished his examination of the patient, his parents anxiously requested to be informed if anything could be done to improve his condition, without subjecting him to any great risk by the method of treatment. The surgeon, having carefully weighed the evidence, replied, that if the boy was fixed to a suitable plane, there would be every probability, that if the joint has not perfectly recovered, the deformity, which now equalled an angle of about 120° would in the course of six weeks be reduced to a horizontal line, but should this plan fail, forcible rupture or direct interference by wound would have to be resorted to; but as either of these were attended by some risk, the safest plan had better be tried first. Further, this operation involved in its application, only a risk that might be properly referred to as the smallest quantity. The parents now objected to subjecting the boy to six weeks confinement to his couch, as he had already spent much time in confinement, and they thought also that the loss of fresh air and outdoor surroundings had much prolonged his disease. To these objections the surgeon replies, that although he had mentioned six weeks as the probable time required for reduction of the deformity, its reduction if possible at all by the plan proposed, would not exceed that period ; but, that only a trial would settle the doubtful point, as the parts might not be so far advanced to resolution as he supposed ; but if they were so, then the reduction might only occupy a period of a few days, and again, fresh air however invigorating, was not so effective a tonic as the act of eradicating a serious ailment, the boy had been debilitated by disease, not from the

want of fresh air. Finally, the boy was placed under the surgeon's charge, who subjected him to the process of reduction of the deformity by fixation to a horizontal plane, continuously maintained. During the first day of surgical restraint, the patient disarranged his "dressing"; which on the second day, had to be re-applied, and a few corrections of the appliance suited to his individual form were also made. When the surgeon visited the patient on the third day, he complained much of lumbar pain, also of pain in the groin and thigh; but there was not any perceptible alteration at the angle of deformity. On the fourth day, the symptoms were identical with those of the third day. On the fifth day, some diminution of the deformity was apparent, and the fixing bandages had to be tightened slightly. This slight tightening of the fixing tethers, "taking in of the slack," was practised daily for about seventeen days, when, as the limb had fallen to the plane of fixation, all traction ceased and the limb in a few days after began to be easier, and at the end of about seven weeks the boy was so free from pain, that he was allowed to take a short period of airing daily. The surgical restraints, however, were continued for three years more, after which the patient recovered with only an inch of shortening, and the limb in a normal line with his trunk.

Case E is an example of a diseased joint progressing well towards recovery, but relapsing from the interruption by the surgeon of treatment because the symptoms became unrecognisable, and a second mistake being made by the boy's parents following the direction of an ignorant person, to consult another—equally unfit to treat the case. The ideal history here reported, is just that which surgeons have to listen to in our days. In the olden time, when the surgeon was thought to have failed, some individual who practised medicine or surgery, as a supplement to his own calling, would be consulted. But his counterpart, in these latter times, adventures with such success, that he can command even the countenance of

qualified practioners of no mean order. By my having referred to this well known fact, I trust it will not be supposed that I wish to impute any dishonourable motives either to the unqualified practitioners of surgery or to the qualified practitioners who assist. My casting the slightest aspersion at them would be very unjustifiable, as the persecution of ignorance certainly would be. The parties, who are to blame, are the general public who patronize the one, and the college which, after an examination, qualified the other.

Case E is clinically, nearly a repetition of case D, but in relation to the former case, the question might very properly arise, How was it that the surgeon last consulted was not able, with some certainty, to inform the parents of the boy, that the joint was unsound when he examined it? The surgeon's hesitancy was perfectly just, for to come to a decision in the affirmative, he would have had to test the case by a method requiring much time, and one which could not be carried out in a consulting room.

The success that resulted from the attempt at reducing the deformity in the case of this boy, informed the surgeon, that when he first examined him the articulation was not perfectly sound. The ordinary test method by watching the result following the use of the joint after it had been long retained in line with the body, was not applicable in this instance, as the limb was already much flexed, probably as much as it ever would be. The method of reduction towards a horizontal line in this

instance, was merely reversing the test method; for, if the articulation had been sound, this method of reduction would not have succeeded.

Case F—Is that of a youth, of about fourteen years, brought to the surgeon for the correction of a deformity of the lower extremity from hip-joint disease. His antecedent surgical history did not vary much from that given in case E, except that the deformity was of longer duration, nearly seven years. The youth was in excellent health, and with the aid of a crutch was able to enjoy the pleasures and perform the tasks pertaining to his period of life. After an examination of the joint, the surgeon informed those in charge of the youth, that the deformity could be corrected, but that he would require permission to try three methods; yet he feared that only section through the main resisting structure would be successful. The patient was placed unreservedly under the care of the surgeon, who tried the method by posterior fixation, and after a week's trial, as he noticed only the signs indicating irritation at the points of leverage and at the fulcrum of the surgical appliance,—no physiological signs whatever were induced in or in connection with the articulation,—the surgeon decided to resort to another method, as the site of the disease was perfectly sound, and as it was not possible to use any more force without injury to other parts, by this method. The patient was next placed under æther and forcible rupture attempted, but from the difficulty of properly fixing the pelvis, this failed, as indeed the surgeon expected, such being his experience of like attempts upon *truly* ankylosed hip-joints. Had it been the knee, he would have been disappointed had he not succeeded. However, while the youth was yet under the influence of ether, directing one of his assistants to fix as well as he could the pelvis, while another controlled the limb, he, taking a chisel and a mallet, applied the chisel to the skin behind the trochanter, at such an angle that the blade pointed across the now almost obliterated neck of femur. Directing the assistant in charge of the limb to use leverage, in a direction across the opposite thigh, he drove the chisel through the skin to the bone, and then partly through the bone, ceasing to propel the chisel as soon as the leverage fractured the bone; the chisel was then removed and suitable compress applied to the cutaneous breach, while the limb was gently drawn down and, on inspection, the deformity was found to have been much reduced. After-

wards the method which had previously failed was applied to correct the remaining deformity, which was effected, in the course of the next fortnight, with only slight irritation of the surrounding parts.

Case F is an example of sound deformed hip-junction in which section of the structures mainly opposing reduction was performed, and to avoid unnecessary injury to the parts, the reduction of the remaining deformity was gained by the gradual induction of unsoundness in the resisting tissues not interfered with by the cutaneous operation.

Case G, that of an adult, consults the surgeon, requesting his aid to correct a deformity of the knee-joint, and attributes his present condition to blood poisoning, some three years previous. The history of his case was, that after a day's extra exertion and exposure to inclement weather, he was attacked with what his family doctor informed him was erysipelas of the right lower limb, from which he was not expected to live, and as the constitutional and local indication of this disease passed away, it seemed to leave inflammation in his knee-joint, which kept him a long period in bed. The joint was treated by medicated lotions and poultices, and finally two abscesses "pointed," one on the inner side of the knee above the joint and another behind the knee. These abscesses, when detected, were incised by the surgeon, giving great relief, and since then the knee had steadily improved; no pain, gaining strength, but no motion, slight pain if any attempt is made to bend or straighten the limb, also some pain if accidentally jarred. After listening to the patient's clinical history, the surgeon made a physical examination of the joint, and noticed that it was perfectly free from liquid, but gained no more information than the patient had already tendered him.

The patient requested to know if the surgeon thought any interference would benefit him. The surgeon promptly replied that the form of the limb could be amended, and that afterwards his cure could be accelerated, but that it might take from a month to eight weeks to attain success. Now the patient wished to know if any "cutting" was part of the process, and whether the surgeon would warrant that the wished-for benefit could not be secured in or about a month from that time, as he was far from home,

and his absence from business for over a month would be a serious loss to him. The surgeon met this objection by informing him, that if he would submit to be placed under æther, the time of treatment would be much shortened, to which the patient assented.

Next day, the surgeon, while the patient was under the control of æther, applied leverage to the limb, in a reverse direction to that of the angle of deformity, and brought the limb so near a straight line, that the deformity was reduced one-half, but further it could not be forced by any power short of producing fracture, which would in this case have been a serious injury, as the two sinuses existing would have made such fracture quite equal to a compound one. So the surgeon contented himself with what he so far had gained, and arranged the whole limb so that the point of deformity was subjected to tolerable and continuous pressure in the direction which would lead to reduction.

When the patient became conscious, he anxiously scanned the limb and expressed his disappointment that it was not straight, but, nevertheless, he would not undergo any more of such treatment. The surgeon, however, assured him that it would not be proper to do so, as all that could be done under the æther, or all that he had expected to gain, had been secured.

The operation was performed at one p.m. Its performance was followed by return of pain to the joint. In the evening, the surgeon again visited the patient, and found some slight effusion within the joint, with increase of pain : for this he prescribed an opiate, and informed the patient that this night would be the most painful, the pain usually only commencing to decrease on the second or third evening, after which the pain would be easily tolerated without the aid of a sedative. On the second day, pain was less and deformity also slightly diminished. Fourth and fifth days, the effused liquid was perceptibly less, no other alteration. On the sixth day, deformity reduced greatly. This gradual reduction and absorption of effused liquid now continued daily, and at the expiration of a month, the deformity was gone, when the patient was fitted up with a surgical appliance suited to make perfectly sound the articulation.

Case G is an exact representation of instances in actual practice, where after forcible rupture under æther, no safe

amount of force would completely reduce the deformity, but moderate force maintained, continuously, must succeed in perfectly correcting the mal-position, by a method which must do some little harm that great good may be gained.

Long before the year 1871 attention had been given by surgeons to popular report, setting forth the success attendant upon the practice of unqualified persons practising surgery and who were supposed to be, in their procedures, guided by some intuitive sense. That our predecessors did not ignore the popular report, but rather failed to detect in the practice of bone-setters anything either useful or new, their writings prove. With the opinion of our predecessors I concur, and it is my purpose in the following pages to defend their credit in regard to the question of bone-setting. I hold with them, that to investigate the subject in search of surgical information, is only gleaning for corn in a field where grain never sprouted.

Of late bone-setting has been the subject matter of volumes otherwise containing valuable contributions to surgery. It has also formed the topic of debate in medical societies, during which innumerable explanations of reported successes by the practice of bone-setting have been advanced; and if the present ignorance in regard to the subject is to prevail, the number of solutions can only increase but never solve the question. That a writer may argue this question and cross the whole ground of debatable matter relating to bone-setting, in a manner satisfactory to the present investigators of this

question, it is very evident that he must possess some qualification beyond having acquired a diploma which indicates that he has had professional training, and a high value seems to be set on personal observation of, and experience in, the practice of bone-setting. It has fallen to my lot to have those two qualifications, and, as regards the extra-academical one, my opportunities of observation have not been limited to the watching of the method of one unqualified practitioner of surgery but of many, the majority of whom had possessed a widely popular reputation; nay, they had among their proselytes even surgeons of good professional repute.

My contention is this, that in the practice of bone-setters nothing is to be found that can be added to our present knowledge, yet discussing the matter will show us our own ignorance. That some of the bone-setters, who practised in past time, were in some few special matters superior to their qualified contemporaries, I know to be a fact, but this assertion does not apply to their general knowledge or practice. And concerning diseases of joints I never met with the slightest evidence that any of them had any knowledge of the subject or a method of treatment which was not utterly wrong.

About ten years ago there were published, certain details, which were supposed to comprise the treatment practised by a bone-setter, to whose practice popular report attributed much success. Soon after the publication of the surmised

secret of this unqualified practitioner's success, one of the ablest surgeons of our time "took the bait" and, when discussing the subject of joint ailments, referred to this new venture as

* "A valuable essay on bone-setting . . . who has thoroughly learned the art, and practises it skilfully. He fully describes the several methods of manipulation, and no one can doubt their value when used prudently."

The respect, which all had for the authority from whom this commendation came, very properly gave the subject an introduction to surgeons, who after this seem to have investigated the subject with a preconceived faith that, in the practice of bone-setters, there must be some valuable but undiscovered knowledge which would add more efficiency to surgery; an article also appeared in one of the metropolitan daily papers noticing our deflection from the straight path, which gave the subject further publicity. Thus all the conditions required for forcing the subject upon scientific and popular notice were gained,—and the question of bone-setting, to borrow a popular phrase, has never "looked back." It has been debated in Papers, Reports, Transactions, and Medical Societies, but it may be predicted that, as our knowledge of the subject improves, the question of bone-setting in relation to the treatment of diseased and crippled joints, will be relegated to where our predecessors left it

* Sir James Paget's Clinical Lectures and Essays, 1879, page 99.

and, ultimately, to where will be relegated mesmerism, spiritualism, thought reading, and other impostures.

Before giving the reader my own experience in regard to bone-setting, I will review some of the published papers and debates relating to this subject, but will confine my criticism to the recorded opinions of those surgeons best known to the profession, a concession to their status rather than to their knowledge of this question which is defective, otherwise they would not have been led astray so far as to second the proposal, to elevate a business of adventure to a place in surgery.

The most important essay, discussing the question here considered, was one published and entitled "Cases that Bone-setters Cure,"* which has been subsequently republished with other interesting essays.† Under the title of "Cases that Bone-setters Cure," was ranged, "Fractures," "dislocations" and "old ankylosis," "slipped tendons," "slipped cartilage," muscular stiffness," "sprains," "old sprains," "hysterical joints."

Concerning the practice of bone-setters, the author interrogates thus,

"What, then, are the cases that bone-setters cure with their practice of wrenching?"

and replies,

"First, of course, they have a certain number of real fractures and

* British Medical Journal, 1867, vol. i., page 1.

† Clinical Lectures and Essays, Sir J. Paget, 1875 and 1879:

dislocations which they reduce, and of old ankylosis which they loosen. Of these, I need say nothing; for I believe there is nothing in their practice in these cases which is not as well or better done by regular rules."

That some of these unqualified practitioners of note were able to treat fractures well and reduce dislocations skillfully, I know, but that they were able to loosen old ankylosis is not proved by any trustworthy record, and is contrary to my personal observation.

The next lesions which the author thinks likely to be overlooked by the surgeon, and thus fall into the hands of and to be successfully treated, by bone-setters, are slipped tendons and cartilages. The accident of slipping a tendon is one of extreme rarity, and to suppose, that cases of this kind can materially aid in building a reputation, is to assume that reputations are easily acquired.

After the slipping of a tendon, it must be reduced early, otherwise it can seldom be retained in its natural position; and even if this accident were overlooked it rarely has a permanently crippling effect, but that, which is most pertinent to the question here argued, is the fact, that at a late period no amount of wrenching or, as the authors term it, bone-setting would rectify this mechanical defect. Wrenching and rationally directed manipulations may reduce recently slipped tendons, and this is what most surgeons have done, if a diagnosis has been possible, as when presented early for examination before there has occurred swelling of the parts.

The surgeon, who wrenches, twists or performs any manipulations adventurously, enters upon a surgical lottery, and his chance of doing the patient harm is much greater than that of benefiting him.

The slipping of cartilage is another form of lesion, in the treatment of which bone-setters are thought to be adepts, but here again no special "knack" is required. This accident is so frequent that its relief is attained, in most instances, by moderate force in any direction that will give a little motion to the locked articulation. The joints in which this accident occurs are generally the jaw and knee-joints. In many instances, the procedure for relieving this disablement, "a patient learns for himself." Until perusing this essay I never imagined that a slipped cartilage was specially liable to be overlooked or difficult to correct.

The slipping of a cartilage within the knee-joint may by gentle manipulation of the limb, be rectified in the same subject, on many such occasions, but it does sometimes happen, that no mode or direction of motion will undo this accident, and on such happening, correction can be made only by treating the articulation as though it had been subjected to injury. These are the cases which bone-setters do not make right. I shall here record some very instructive example of this.

Some five years ago I was consulted by a clerical gentleman, who stated that whilst getting out of bed, "the cartilage" inside his knee had slipped out of place, and the sensation which this accident had caused

remained. He also mentioned that this mishap had occurred to him before on more than one occasion, and that he had not, at any time, been properly relieved until he had submitted his limb to the manipulation of one of the metropolitan wrenchers. After this history of his case, I examined the knee-joint and could find no trace of any physiological or mechanical derangement. The consultant, however, said he felt sure that there was some displaced cartilage, as he had a local sensation similar to that which he had felt on former occasions, when he was informed that he had a slipped cartilage and, as manipulation had eased him before, he wished it done again. He also added the remark, that the success of the manipulation previously performed proved some displacement. My reply was, that his knee was in such a healthy condition that some degree of manipulation might be performed without injuring the articulation. His knee was firmly extended, rotated and suddenly flexed, which was done rapidly and painlessly, for the patient having no acute pain, relaxed all muscular control of the limb during our manipulation. The patient informed me after the operation that no improvement followed, consequently, at his special desire, the procedure was repeated, but with no success. Now he was advised to have the joint treated as though it was a case of injured knee-joint, which he promised to do. Afterwards we had a conversation regarding the success which had followed the treatment, by manipulation, of his former accidents, and, although I could not by cross-examination materially alter his evidence, relative to the immediate relief which, he said, had followed the manipulations of the wrencher, still, by the conversation, there was conveyed to my mind the impression that, without intending to do so, he reported the relief which had followed the manipulations of the metropolitan, as being more immediate than it really was, arguing with the bias of a convert whilst he posed as a specimen of the success of a specialism.

After an absence of six weeks the reverend gentleman again presented himself, and, to my enquiry, "How does the joint feel?" he replied, "After consulting you, a feeling of dissatisfaction induced me to hie off to the metropolitan practitioner whom I had consulted in my earlier difficulties, but his treatment has not given me ease." I asked him to favour me with the details of the treatment which he had undergone. The patient then informed me that, as soon as the specialist had examined his knee, he gave as his diagnosis, that it was a case of displaced cartilage, and that he would replace it immediately, which he attempted to do by manipulations like

those I had performed, and as soon as the operator had finished, he said, "Now, you are all right, get up and walk," which the patient did, but found that the discomfort within the knee remained, and of this informed the practitioner, who at once repeated the manipulations, but with no success. The manipulations were several times repeated, but in vain and the sufferer had returned to consult me again.

On again examining the knee, there now could be detected a slight effusion of liquid within the joint, and my advice to him was the same as that I had given him during his first visit to me. This he consented to follow, and after a course of six weeks treatment, the joint appeared normal and the patient was not sensible of any ailment.

That this case had, on any occasion, been *immediately* relieved by treatment, is to me doubtful. On the last occasion of the patient's subjecting his limb to manipulations, such treatment decidedly failed to ease him. But the conversation which we had regarding his case, had sharpened his wits and weakened his faith, but curtailed his patience, so that he expected a rigorous fulfilment of the promise of immediate relief.

Eight years ago I was consulted by a young lady with locked knee-joint, from supposed slipping of cartilage within the joint. The knee was acutely painful, with slight effusion. The patient informed me that this accident had happened previously on several occasions, but that a gentle shake of the limb had always relieved her before. After this history of her case, I attempted to relieve the sufferer by gentle manipulation by moving the leg in a direction to which there was least muscular resistance, but this failed to ease the pain and lock of the joint, consequently, the articulation was subject to the treatment proper for a knee-joint which might have been disabled by traumatism; this, in the course of about six weeks, brought about such a condition of the joint that the articulation was fit for ordinary use.

The joint remained perfectly well for three years, when again, as the result of the slight twist of the limb, there appeared the signs of what is

generally accepted as those pertaining to displacement of cartilage within the knee. There was some slight effusion of liquid on this occasion, but the pain was so acute that the lady would not permit of any manipulation, consequently, the articulation was treated as an ordinary injury of the knee. At the termination of four weeks the recovery of use was perfect, and there has not been since—a period of four years—any recurrence of the difficulty.

These two cases are not isolated examples in my experience of failures to reduce slipped cartilages by manipulation. Such accidents are by no means rare, and it is my experience, that when these cases are efficiently treated by fixation, a permanent relief from liability to the derangement of this joint is secured.

The author next discusses the treatment by manipulation of “muscular stiffness of joints,” and as this portion of his contributions to the subject contains, in my opinion, very palpable mistakes in diagnosis and treatment, it is necessary in order to combat them fairly to reproduce here nearly all the paragraphs relating to the treatment of muscular stiffness by manipulation.

In the first paragraph there is to be found a description of the “muscular stiffness of joints” which bone-setters cure. It is as follows:—*

“A fourth set of cases that may be cured with wrenching, or other forcible movements, includes those in which injured joints are held stiff, or nearly stiff, by involuntary muscular action. You may meet with such cases in patients of any age; but they are most frequent among the young. Sometimes after well-treated fracture near a joint; sometimes

* *Op Cit*, page 92.

after a sprain; sometimes when a joint has been hit hard—stiffness remains, which is due solely to muscular action: and this stiffness in some cases is constant, and in others ensues on slight attempts at motion.”

Involuntary muscular action is never an immediate symptom of injured joints, and can be met with only after an injury to, or when disease in, a joint has been cured; or in a case of diseased joint which must have lasted some time, then there may be involuntary muscular contraction, though the disease be still present. Involuntary is not an appropriate term to use to describe the actual muscular condition of the part, as a structural change has taken place which impedes the action of the muscles, and this impediment is to be met with in all periods of life,* but is more prone to happen to the aged than the young. The liability is slight in children under ten years of age, but when the prime of life has been passed, whether the patient's joint be subjected to injury or be the subject of inflammation, muscular stiffness is to be feared, yet the tendency to suppurative inflammation of joints is generally less in the aged than in the young. The treatment of involuntary muscular stiffness by manipulation is in most cases rather a hindrance than an aid to the regaining of the normal range of muscular action. The same rule applies to the treatment of muscular stiffness after sprains of joints, or any injury, as when “a joint has been hit hard”; indeed it more strictly applies, for if trivial injuries are long accompanied by muscular stiffness, then some degree of

* See foot note, page 51.

unsoundness of the articulation should be suspected, and manipulations, if persisted in, might induce permanent defect. *The practice of manipulating joints, that are stiff from any abnormal condition of their muscles, is in theory and practice wrong.* That in some very few instances, joints thus hampered have been relieved, is undoubted, but to assume that the joint must have remained stiff, unless the manipulations supposed to have corrected the defect, were performed, is to advance conclusions at variance with demonstrable facts. When manipulations have apparently relieved stiff joints, some risk has been incurred, and the real gain has only been time, as the joints would, without manipulation, have acquired full action, but would have taken a much longer time to do so. It may be laid down as a general and trustworthy rule that, if there be present *any* voluntary motion of the articulation (provided it be sound), then more will follow; yet if, after injury, the articulation is altered in shape or relation of parts, some limitation of motion may remain, but even with this drawback spontaneous complete restoration of motion may follow.*

The next paragraph that demands discussing is †

“Any joint, I believe, may be in this condition at any time after an injury. I have seen it at the elbow, shoulder, cervical spine, hip, knee, and ankle; in some instances a few hours after the injury, in some, several weeks. You may know this muscular kind of stiff joint by this, among other signs: that the stiffness is not a dead block, as if by meeting of

* See Elbow Joints, Part VI.

† Op Cit, page 92.

displaced bones, nor has rigid resistance, but yields a little, as if with the 'giving' of a firm elastic substance which instantly recoils. Besides, you may generally feel the muscles in action; not hard and vibrating as if with all their force, but firm, steady, and resisting. If, however, you have any doubt about the diagnosis, ether or chloroform will settle it. As soon as the patient becomes quite insensible, the muscles relax, and the previously stiff joint becomes freely moveable."

The muscular stiffness, which "yields a little, as if with the giving of elastic substance which instantly recoils," is a condition of a muscle in connection with injury to or disease in joints, which is indicative of an unsound articulation, and the more such muscles are subjected to force, the longer the joint must remain unsound, the less it is interfered with by manipulation, the sooner it is mended; but, when the muscles feel "firm, steady and resisting" (passive but shortened), such cases of stiff joints (if sound) may, in some rare instances, be loosened, but not without risk of injury to the joint. To give an anæsthetic when the first-mentioned condition of muscle and its attendant tender joint exist, would only make a diagnosis of the actual condition of the joint a difficult one, as it would obliterate the most important diagnostic symptoms and probably lead to what is termed manipulations, bone-setting or passive motion; between either of which evils I am not able to perceive a difference.

During the last twenty-six years I have repeatedly tried manipulations to loosen joints crippled in their action, and have watched the practice of qualified and unqualified practitioners, famed for their skill as manipulators of diseased and

injured joints ; and, again, I have been educated with a bias in favour of such treatment yet, notwithstanding all this, unmistakable evidence of its evils has led me to discard it myself, and to advise others to avoid the adventurous treatment recommended by the author of the lecture "On Cases that Bone-setters Cure."

This essay contains evidence in support of my teaching : for instance—

"Herein appears the best mode of cure. When the patient is insensible, move the joint quietly, and then confine it with splints in a posture opposed to that in which it was stiff. After a day or two, it may be moderately exercised, douched, and shampooed ; but in the intervals of this treatment the joint should be confined with the splints, if it should appear to be becoming stiff again."

The summary of advice given in this paragraph is, that force should be applied one day, but rest another day ; or it may be summarised as an advice to undo, on the morrow, the injury done to-day.

The next portion of the essay is one which plainly shows that our etiology of some injuries to bones is defective.

"You may sometimes see another condition, very like this involuntary muscular rigidity of joints, in young children. If one of its limbs be hurt, a young child will sometimes hold the limb steadily in one position, and complain if it be moved. Thus, a child, whose thigh has been strained, will stand on the other leg, and keep the hurt thigh lifted up, as if for extreme disease of the hip-joint ; or, for similar hurts, will, for even many days, keep its arm close to its side, or its elbow-joint steadily bent."

"Perhaps, some of these cases are the same as those I last spoke of ;

but in many of them the muscular fixing of the part has seemed to me not involuntary. It is more like a trick, or an instinct of fright lest the part should be hurt again. Certainly, the muscles relax instantly in sleep, and not unfrequently when the attention is distracted from them."

It is not an uncommon event for the surgeon to be called to inspect a child and to find him holding "the limb steadily in one position and complain if it be moved," and posing himself so that when the injury happens to the lower limb hip disease is simulated. The limb, if carefully examined, by passing the thumb firmly along the anterior surface of the thigh, will be found acutely tender at the junction of the upper epiphysis with the apophysis where, in fact, strain of the part has happened; and, in most instances, if the limb be not aided by some slight support, deformity may result. An injury of the lower junction is most rare, and in both cases the accident is frequently overlooked. Again, when a child generally under four years of age, "for similar hurts will, for even many days, keep its arms close to its side, or its elbow steadily bent," it would be an error to diagnose it as a mere trick or fright. These cases are very common among infants, but I am not confident of the exact nature of the lesion, and surgical records do not refer to it. The majority of these cases are not diagnosed by the surgeon and, probably, recover spontaneously.

A description here of such cases and their appropriate treatment will perhaps aid in leading to the detection of the exact nature of this lesion.

This accident is invariably the result of applying traction and pronation by grasping the hand of the infant.

The mother or servant by whose agency the accident occurred, often brings the child for advice, and informs the surgeon that she only pulled him by the hand, which caused him to stumble whilst still held by the hand, and since then the arm had been disabled, and that the infant complained if any attempt were made to flex the elbow. On examination, the surgeon finds that the arm lies dependant, slightly flexed, and pronated, and that the child dreads being touched. If the arm be forcibly flexed and manipulated, it may or may not be instantly relieved,—but this is not what the surgeon ought to do. There is a method which—if followed—is painless to the child, is immediately effectual, and favourably impresses any observers. We will here suppose that it is the right elbow. The surgeon must very gently grasp the child's hand with the thumb and index finger of his own right hand, planting his thumb in the palmar base of the child's thumb while the index finger hooks round the ulnar edge and back of the child's hand, then placing the olecranon point of the child's elbow in the cupped palm of the surgeon's left hand, let him supinate the arm, and at the same time *fully* extend it, using the cupped palm of the left arm as a fulcrum; and now the surgeon in nearly every case will feel a click of some part slipping into place, and then let him instantly flex the elbow and fix in a sling.

The procedure is painless and the relief instant, and in nearly every case the little patient, after this operation, expresses a desire to use the elbow. Those in charge of the patient often imagine that the collar bone is the seat of the injury, the patient himself being too young to be interrogated, but the helpless, dependent and slightly flexed appearance of the arm, which is obvious at first sight, is always a safe guide. When operating on the left elbow, the surgeon must repeat the manipulation with the right hand behind the joint and the left in charge of the patient's hand.

Before departing from the question of the best treatment for joints stiffened by muscular action, I will relate some cases substantiating my views, here contended for, which probably, the reader may think are enunciated somewhat dogmatically.

About three years ago, a gentleman accompanied by a lady visited me. The former introduced himself by informing me that he required my advice for his elbow-joint, immediately after which the lady handed me a note, which contained the history of his ailment. It informed me that the gentleman, while in a situation in the metropolis, had fallen and injured his elbow-joint, and had during many weeks been treated as an out-door patient of one of the large hospitals in the city, and that, latterly, the treatment mainly consisted in frequently placing the patient under the influence of an anæsthetic and performing motion of the elbow-joint, which afterwards caused him much pain. The writer described it as "horrible torture," and intimated that the patient was not to be meddled with, except I could promise a cure, "as he had suffered enough already." After perusal of this impertinent note, I examined the elbow-joint, and found it fixed by voluntary muscular action, very painful, but with no swelling, nor with signs of effusion. The position of the forearm in relation to that of the arm was that of an obtuse angle. After examination I informed the patient that it was not customary with surgeons to enter into any warranty regarding future results and, further, that if he wished me to treat him, he would have to allow me to do that which I thought proper, without any reservation. After a discussion with his companion, the patient decided to place himself unreservedly under my direction. His elbow was treated by the simple method of fixation, which it is my habit to adopt in most cases of inflamed elbow-joints.* He was rather astonished at the simplicity of the treatment, as he had expected to be hauled round the "smithy at least three times." After fixing the elbow, I desired him to return not sooner than three months, but if not convenient so early, a month or two longer would not matter. There was a good excuse for permitting a long absence, as the joint had all the signs indicating that, if left untouched it would soon recover. It was plain that its tendency to recovery had successfully struggled so far against treatment of an opposite tendency. On his return, at the expiration of about three months, I found the joint truly ankylosed,—sound consolidation between the bones—but to make certain I advised him to throw off all restraint and test it by use, and after two months' test to return for my inspection. At the termination of the two months I found the joint had withstood the test, and now the patient was advised to be content with the result, true or sound ankylosis.

* See Elbow Joints, Part VI.

However, in about three or four months after, he returned and wished me to make an attempt to restore motion at the elbow. The joint appeared perfectly symmetrical, not the slightest difference existing between it and the other elbow ; and it did appear as a case in which motion might be restored. He was given an anæsthetic ; but before attempting the restoration of motion, I expressed to him the opinion that the operation would probably fail in effecting the desired result, and that my experience inclined me to this conclusion. After giving the anæsthetic, the elbow was forcibly flexed, during which act a fracture occurred in the ankylosed junction, afterwards it was extended nearly to a straight line and immediately fixed again at a right angle. From the information gained during these manipulations, I was confirmed in the opinion that there was bony ankylosis. In six weeks time the joint was perfectly well again and has remained so since but, as I anticipated, no gain accrued from the experiment.

Here is a mild case of inflamed elbow-joint with its inevitable voluntary muscular stiffness or action, treated by manipulations, in such a manner that it rapidly terminated in ankylosis. This was [such a case that, if no advice had been sought for, it would have recovered with motion and free from all defects, and there is a high probability that the teaching in the essay here criticised, influenced the practitioner who had originally attended this case.

The author of the essay, on "Cases that Bone-setters Cure," catalogues under this heading numerous and frequently met with types of cases, and advises a treatment what is at best only sacrificing the many to save the few exceptional difficulties.

Supposing, we grant, that at times the treatment of defective joints by certain or any mode of manipulations could benefit,

even then the discredit of crippling the many far outweighs the credit gained by the relief of isolated cripples.

About eighteen months ago two other cases of elbow-joint inflammation, came under my observation. Both cases had been previously treated by manipulation, while the patients were under the influence of an anæsthetic, one as an out-door patient of an infirmary in a large neighbouring town, the other by surgeons of good repute for skill in another large provincial town. They consulted me at a time when the treatment had become unendurable, yet, by following my customary advice, on their return in six months, recovery had followed with rapidly formed sound ankylosis—which the primary treatment had made—an unavoidable termination. That manipulations of tender joints tend to ankylosis, the etiology of other surgical lesions can further prove.*

About three years ago, I was consulted by a joiner suffering from inflamed elbow-joint, with all the characters of joints pertaining to the first case here reported. He had been treated by manipulation. I advised my customary treatment, and in three months he had recovered with apparently sound ankylosis, a termination, for which his previous treatment led the way. After I had pronounced him well and fit to resume his employment, there arose a monetary question in relation to his remaining defect, the patient being a member of a trades' union, the head quarters of which was in a large town some forty miles from my habitation. Through having recovered with some defect he was entitled to a bonus from the funds of the society, but to gain this he was required to submit to inspection by a leading surgeon nominated by the society; to which the man agreed, and the surgeon advised excision of the joint to gain motion; to this I demurred, as there was no disease and the subject would be able to work at his trade better with a sound ankylosed joint, than with a flail joint which, though strong to carry a bucket, would be of little use to push a plane or strike from the shoulder. The advice of another surgeon in this town was sought to settle this difference of opinion, and as he also advised excision of the elbow, the manager of the trades' union made it conditional that the bonus would only be paid after the joiner should have submitted to excision. To this the joiner objected, and decided to follow my advice and forego his bonus. Some twelve

* See article on Fractures.

months after this termination of the dispute, I visited a street in this town in quest of a patient who had summoned me to his aid, and happened to knock at the wrong door when, to my surprise, my late patient the joiner opened the door. I asked how his arm "stood wear," to which he replied, "very well" and, at my request, allowed me to inspect it when, to my surprise, I found some little motion at the articulation. Excising a joint does not always lead to an amendment of the part any more than dismissing the doctor cures a complaint.

Some few years ago, I had under my supervision a gentleman residing about four miles from this town. He was suffering from slight inflammation of knee-joint with moderate effusion. During one of my visits to him, after my attendance had extended over six weeks, he expressed himself as dissatisfied with the progress he was making, and stated that, from conversations which he had with his friends he also feared that we were not on the right tack of treatment; and, furthermore, that he had been strongly advised to consult one of the well known metropolitan wrenchers. I assured him that he was progressing to recovery and that the treatment aided us in that direction, whilst the treatment, which he might probably be subjected to by those he alluded to, would be very unsafe. He then tried to neutralize my warning by informing me, that a knight, residing in a neighbouring county, had been under my care about the same length of time as he had, who after discarding my treatment and submitting his joint to the manipulations of a metropolitan wrencher, he was soon well. The knight's recovery, he said, had been marvellous, as he was able to attend committee meetings, to walk miles daily, and he appeared to be free from all defect, all this taking place in two weeks after submitting to other treatment. My reply to all this information, which was new to me, was this, that in the case referred to, the inflammation of the joint was not of such intensity as that of his joint, and though the case he alluded to, might now be well,—I had doubts of its being so; and that, presuming on a long acquaintance with the knight upon whom such a wonderful cure had been performed, I would write and ask permission to visit him, in the manner of a pupil. In answer to my communication, praying for an audience with a special purpose, a reply was returned, informing me that, as he would that week visit town, he would call at my house and aid in supplying me with any instructive information which I might ask for. The promise was fulfilled, and after we had exchanged the usual civilities, I asked how he felt the knee-joint, and he replied that he felt it

well but weak, and that the treatment he had undergone in the metropolis had much benefited him. He had been placed under the influence of an anæsthetic, during which all his muscles had been drawn and brought to their right measure, in which way he could not tell, as being unconscious, and no one was present except the operator and his co-partner in the transaction, who had given the anæsthetic. After he had given me so much information, I ventured to hint that an inspection of the joint would be very gratifying to me. My late patient at once assented, and exposed the joint, when the following dialogue took place :—

You will perhaps recollect that during the time you were under my care, the knee was sometimes tested in a special way, to enable us to gain information of its condition?

I recollect the act you refer to.

Do you remember that the test was carried out by observing the condition of the muscles in connection with the tender joint, and comparing them with the behaviour of the muscles in controlling the opposite knee-joint?

I do, and all the contraction then observed has disappeared.

Would you permit me to test the joint just now as we were accustomed to do?

Certainly.

The joints were compared and, to the astonishment of my visitor, the joint which was supposed to have been cured and free from defect, was rather more deformed than when it was under my care. Since leaving me he had not tested the articulation for deformity. After he had recovered from his surprise, he asked, "What would be the best course to follow?" as, it was evident, he was worse not better than when he set aside my treatment. My reply was, that as the maltreatment, which he had lately submitted to, had not seriously deteriorated his joint, we might conclude that a moderate amount of fixation would lead to resolution. Armed with my directions how to manage his ailment, he visited the continent, and on his return after the lapse of three months, on examination the knee-joint was found perfect.

Soon after the incident with my suburban patient, "his head man of business" consulted me, suffering, like his employer, from a defect of his knee-joint. On making an examination of his knee I could not detect any fault of the joint; there was no effusion or swelling within or without the joint; flexion and extension were perfect, but the muscles of

the thigh had not recovered full power, and the diameter of it was less than that of the opposite one. Upon inquiry, I learned that the patient had suffered from slight inflammation, with liquid effusion into the joint, and had been very successfully treated by a metropolitan surgeon. After receiving this information, I informed the patient that, from the success that had followed the treatment, adopted in this case, there remained nothing to prescribe for, as use would in due time restore muscular power. After this interview, there passed an interval of time, not far short of twelve months, before he again visited me. On the occasion of his second visit, I examined the knee-joint again, but could find no ailment, yet the muscles of the thigh had not been restored to their full power or bulk. In answer to my question, if he had adhered to my advice, given at his first visit, he replied, that he had not but had gone to a metropolitan wrencher who diagnosed a displaced cartilage as the cause of the partial atrophy of his thigh muscles ; but, on his return home, after submitting to the manipulations he felt the joint not so well as before and wrote to the operator informing him of that fact, and received a note, which the patient gave me for perusal, and of which a copy is subjoined :—

Dear Sir,

Thanks for your letter to hand, I am sorry to hear that your leg has been worse, very likely you may have disturbed the cartilage or fibula. I must advise you to keep quiet, still you must use your own judgment according to the symptoms. I purpose visiting Manchester in course of ten days. Carry on. See me on my visit.

Yours respectfully,

My consulter now feeling convinced that there was no mechanical derangement of his knee-joint, did use "his own judgment," which was to patiently wait for the redevelopment of muscular power, by exercise of the part.

Five years ago, a gentleman residing on the opposite side of the river, whose son was under my surgical treatment, suffering from inflammation of the knee-joint, wrote a note, requesting a special interview at any time, when I could spare an hour, as he desired to discuss carefully with me the condition of his ailment and prospect of recovery. The interview was duly arranged, and when we met he commenced the conversation by stating, that he felt anxious about his son's condition, which had now lasted some two years, and that if any progress to recovery had been made

it was very slow, and that the gratuitous advice and counsel constantly urged upon him by his friends to have the treatment changed was giving him great anxiety ; but what specially had shaken his confidence was the fact, that the daughter of a well known engineer, making no progress whilst under my care, had been taken to one of the metropolitan wrenchers who treated her with such success that the girl was now walking about free from all restraint, in short, if not cured, nearly so. To all this I replied, that the case had not been under my care, and that I had been called about eighteen months ago, to visit the patient once only, in conjunction with the usual family physician, and that my opinion was given, then my connection with the case ended. I also informed him that the patient was afterwards treated by one who retails a commodity, which passes in these quarters as "the best opinion," who soon advised excision. I also expressed my gratification at learning that the girl had been so successfully treated elsewhere but, as eighteen months had passed since I examined her knee, a great change was not impossible in that time ; still from what I had observed it did appear to me improbable that she could have so rapidly recovered by any treatment. My visitor suggested that an inspection of the case would be instructive to myself, in which I concurred, and he agreed to arrange with the lady's friends to give me an opportunity of observing the success of a treatment which, judging of its merits from general report, all surgeons ought to understand.

On an appointed day, the father of the young lady met me at a railway terminus and we travelled together to his country residence, a distance of ten miles from this town, and on our journey he stated that the proposition to excise the joint having alarmed him, his friends happily suggested his giving one of the metropolitan wrenchers a trial, and that the treatment and advice the patient had received, by adopting his friend's suggestion, had much benefited the patient. On our arrival at the gentleman's summer residence, we were informed that the patient was out in the field, and I was placed in a room, on the ground floor, in which the window was open, the weather being very hot. Soon the subject of my visit approached and, as distant sight was enough, I arose to leave, when the gentleman said, "will you not wait to closely inspect the case." My reply was, that what I had already observed was quite convincing evidence to me of her condition, as there was no resolution of the disease but there was increased deformity since she was first examined by me. He now begged me to examine her more closely, but excusing myself upon the plea, that as I had only come to gain

information not to give it and, as she never had been my patient it was not for me to interfere ; but the father would not be refused, and I confess to the sin of succumbing to the plea of the parent. On examination, the knee had all the evidences of a joint which had for a long time suffered from inflammation, and was still in that condition, as there was false ankylosis and acute pain on the slightest jar. After this examination I informed the parent, who pressed me for an opinion, that the case was not progressing to resolution.

This case was being treated, and as far as I know continued to be so by occasional manipulation, shampooing and baths, and I am informed she is still a cripple, while my patient, whose case led indirectly to my investigation of the young lady's condition, has recovered with a supple joint and no muscular stiffness, after being continually and uninterruptedly retained for a period in a knee-splint seven years.

Eight years ago, a lady brought me her son, a little boy six years of age, and requested me to examine his hip-joint. With my request, to be supplied with the history of the case, the lady would not comply, and excused herself by stating that an opinion only was required. On making an examination of the patient, I found hip-disease and its accompaniments, angular deformity and ankylosis ; there was not the slightest motion at the joint ; there were cicatrices, showing that the suppurative stage had been tided over successfully. My opinion was given in accordance with the evidence. In a few days I was requested to undertake the treatment of the boy, with the view of inducing cure and correction of deformity. He was efficiently and uninterruptedly fixed for a period of seven years ; and although, I had repeatedly expressed, during those years, my belief that the patient would recover with true or permanent ankylosis ; yet, at the termination of the seven years, when I had evidence that the case no longer required any surgical supervision, there was found, on removing all restraint, motion of the hip-joint, which finally increased up to the normal range. This patient resided with his parents, in a township about five miles from here. About three years ago, when meeting in consultation with another practitioner in that neighbourhood, I learned for the first time the history of the foregoing case. The boy had been in his charge and was doing well, when the parents decided to take him to one of the metropolitan

wrenchers for advice, and the practitioner in attendance accompanied the patient. When in the metropolis there had been a consultation between my friend the narrator and the wrencher, and it was decided (much against my friend's opinion) that the hip-joint should be put through the magic evolutions which, in essays upon this subject, are described as essential to success. All these were in due time performed, while the patient was under the influence of an anæsthetic, administered by a gentleman who had adopted this as a speciality. My neighbour who was beforehand biased against the performance, and was more so when finished, asked the gentleman who administered the anæsthetic, if there was "rhyme or reason" for what had been done, to which he made no reply. On the boy's return home, evidence of suppuration of the hip-joint and its rupture, which soon showed subcutaneously, was apparent. Through this critical condition, the boy had successfully passed, when some misunderstanding arose and my informant retired from the case. This is another example of error in diagnosis, which these manipulators only accidentally avoid making, treating the muscular condition which is only a symptom, as though it were the seat of the disease and not merely an accompanying defect.

Twenty years ago, I was appointed surgeon to a large trades' association composed of carpenters, and at the close of the first year of my service to the association, one of its members called upon me suffering from some ailment of the shoulder-joint. I was not certain then what the exact nature of his joint's defect might be; however, I treated him, as other surgeons would have done then, with mild counter-irritation and strapping of the joint with plaster. This treatment was continued for some weeks, the patient making only slight progress to recovery from what (I know since) was chronic inflammation of the shoulder-joint. About the sixth week of treatment, the patient informed me, that his employer insisted upon his consulting a famous bone-setter, who was assisted by his son, a qualified surgeon. To me this was very annoying, as it might have led to something more, my appointment might be imperilled, and in order to make a call for my resignation of the appointment less probable, I readily and pleasantly concurred with the suggestion of the carpenter's employer, and with the unexpressed but obvious wish of the patient, and begged that when he was tired of, or cured by, his new advisers, he would favour me with a visit. Before parting with him he tried, at my request, how

high he could reach with the index finger of the hand belonging to the limb the shoulder of which was disabled, and the height he was able to reach on the wall was carefully marked. I now lost sight of my patient for about six weeks, during which time it was "noised abroad" among the members of the association, whose confidence I was very proud of possessing, that I had failed to relieve this member's condition, and that the bone-setters were my superiors in lesions of this character. About six weeks after the carpenter had left me, I was served with a notice from the secretary of the association, that I was to inspect another member, supposed to be malingering, who resided in an ancient city some 15 miles away from here, and that he would be ordered to present himself for examination on an appointed day. At the time appointed the suspected carpenter appeared, and gave as his history, that he had been twelve months in receipt of relief from the association, his inability to work, having arisen from an injury to the shoulder-joint, for which he had been treated by two bone-setters, one qualified, the other unqualified, but as yet his shoulder was neither equal to the task of his daily work nor free from pain, and that often at night the pain was such that he would arise from bed and perambulate the city walls, as his sufferings were always worse when reclining. I now examined the joint, and found only limited motion, with all the symptoms similar in character to those observed in the case of the carpenter who, while under my treatment, transferred his confidence to others. Perceiving how very similar both cases appeared, I decided to make a closer comparison; so, accompanied by my last patient, we visited the first-mentioned sufferer, who received us very kindly saying, that he was just about calling at my surgery but that visit would save him the journey. A careful examination of both cases, showed me that they were in every way identical; my first patient had not improved so far as I could judge, and had been treated for some derangement of the joint by moderate manipulation, no anæsthetic being employed. He asked me if I would undertake his treatment again, which was declined until four weeks more had expired. At the termination of these four weeks (in all ten weeks) he visited me, and I tested him in regard to the power and range of action at the joint by watching his attempts to reach the pencil mark made on the wall ten weeks previously, but he could not run the finger on the wall any higher than the mark. Both men were submitted to my treatment and I was able to relieve them, which prevented a rent in the confidence which the members of the association placed in me,

About twelve months ago. I received a letter from a retired naval captain, an old patient of mine, residing in the metropolis, in which he wanted to know if I could cure a lame gentleman whom he had met at his club-room. I wrote in reply to request particulars, on receipt of which I informed my correspondent that his friend was probably suffering from slight inflammation of the hip-joint and that there was a probability that the ailment could be cured. Upon receiving my opinion, the patient, a retired army officer, paid me a visit, and an examination of his lower limb showed me that my surmise was correct. The history that he gave of his case was this, that three years previously while in the hunting field, he had slightly sprained his hip-joint, but had felt only very slight discomfort from the accident during the first twelve months, afterwards it had gradually become worse, so that now the limb was deformed and too tender and weak to tolerate its use in progression without the aid of two walking sticks. This was a mild case of hip-joint inflammation very characteristic of such cases when occurring at this period of life, just over the meridian. He had consulted nearly every leading physician and surgeon in the metropolis, and also every qualified and unqualified manipulator that he could find, and even visited a continental city to be attended to by a celebrated manipulator there; but the more he sought for assistance the worse he always felt after being treated, so that sometime before he visited me, he had come to the conclusion that he would seek for no further assistance, and had come so far from home, to get my opinion only. After I had given him my view of his case and explained the treatment that might benefit him, he decided to stay a few days, the better to understand my instructions and then return to the metropolis to continue the treatment himself; but after he had been under my tuition and treatment during two weeks he decided to stay a while longer, and finding himself progressing well, he extended the time of his sojourn here until he had spent five months under my supervision,—after which he returned to the metropolis free from both pain and deformity and able to progress without the aid of support.

Here is a case of disability with muscular stiffness, in which manipulations performed by specialists, qualified and unqualified, had failed to relieve, but rather had effected the reverse, all such operations making the case worse as, indeed, we might

expect rationally. The case was treated by authorities in medicine and surgery, and by one who professes to have made ankylosis a special study, but with no beneficial result. All he consulted made the mistake, which the author of the essays I am discussing also makes, of supposing that the muscles were able but obstinate, whereas the actual condition of the muscles were that they were unwilling, being cognisant of the disease in the joint and of the damage that might accrue to the articulation if they relaxed their intelligent control.

Soon after the termination of the treatment of the last reported case, I received a letter from a retired army general officer, in which was contained the history of his ailment, almost identical in all its details with the last case which I have given; but, as the patient was very far advanced in years, the ailment, inflammation of the hip-joint, did not much curtail his enjoyment of life, so I dissuaded him from consulting me personally or submitting to any treatment; but, despite my counsel, he paid me a visit and I found that my surmise, from the written details which he had sent, was correct. He had been well manipulated by persons who practise the supposed orthodox twists and turns, but with the result, to which I never yet have seen an exception, of failure or aggravation of the difficulty.

Ten years ago, I was called to attend the son of a corn merchant in this town, aged about twenty-eight years. While from home, on the opposite side of the river he had engaged a cab to take his companions and self for an airing, but before the excursion ended, the horse from some cause became ungovernable and commenced to "run away." My patient made an attempt to get out of the vehicle and control the horse, but failed and fell down rupturing subcutaneously the muscles of his fore-arm and severely injuring a knee-joint. The symptoms, which followed these two lesions, were those common to such injuries, but he progressed to recovery with extreme slowness, the arm, elbow and knee-joint being stiff and feeble, and remaining in the unsound condition an exceptionally long time. Some time in the latter period of my treatment of the case, and on the occasion of

one of my visits, I met the father and friends of the patient, when they commenced to interrogate me in a style, that showed me that they were not satisfied with the past progress of the case, and also that they were apprehensive that the termination would not be satisfactory. The lesion had been treated by fixation for a long period, as the state of the limbs supplied me with very obvious reasons for so doing. In defence of my policy of treatment, the conditions of the injured parts were explained to the friends and my prognosis was very favourable. When my defence was finished, the father of the patient, evidently by no means convinced or in any way influenced by my arguments, tartly informed me that by the very same mode he had been treated, and that he had recovered with permanent ankylosis of the elbow-joint—a very hampering defect. I immediately replied, he was mistaken, that his elbow had not been treated according to either the principles or method followed in the case of the patient, for his own case was that of a very severe fracture of the forearm, with much blood effusion and tension of the arm. For the fracture he had been very successfully treated by an unqualified practitioner, but that unfortunately when his fracture had consolidated, there remained some stiffness of the elbow-joint; for this he consulted a leading surgeon in this town, who so persistently manipulated the joint by that senseless performance known as “passive motion,” that the elbow, stiff from some slight unsoundness, was converted into a true or sound stiffness. My critic was astonished at the revelation, as it referred to an event of thirty-five years past at which, then a youth, I chanced to be present. After this my treatment was never questioned. To make sure of a permanent cure the patient’s limbs were controlled until the infallible signs of recovery were easily recognisable, when my prognosis was fulfilled, as the patient ultimately presented no defect.

Three years ago, I was consulted by a Manx farmer, suffering from inflammation of the shoulder-joint. The history of his ailment was, that some six months previously he had strained it, but fearing that he had displaced “some bone,” he consulted a bone-setter, residing on the island, the son of another bone-setter now deceased. This gentleman informed him of the nature of his disablement and advised appropriate treatment, but the patient, on account of the slow progress to recovery, consulted a qualified practitioner, who practised passive movement, in various directions, on the joint. This treatment much aggravating his ailment, he then consulted me. I advised a return to the

original treatment, which after being continued a long time brought about nearly a complete cure, only with some slight limitation of movement. This cure with defect might be explained upon three grounds, the inflammation had existed nine months, eccentric treatment, and the patient's age, over sixty years.

About eight years ago, a coal-shipper, residing in one of the suburbs of this town, visited me to have my opinion regarding his elbow-joint. On examination it was found free from pain, there was good motion, but the patient could not perfectly extend the joint. He had been under the care of a personal friend of mine, residing close to his residence, who had pronounced the joint cured. After my examination of the case, my conclusion also was that the joint was sound; he was advised to employ cold compress at night and to use the joint cautiously, and return at another time for my opinion. On his return after three weeks, he informed me that he had consulted both a well known metropolitan orthopedist and also another practitioner who advocated and practised the wrenching of joints. The first advised that a blister should be applied to the head of the radius; the latter urged my patient to submit to manipulation while under the influence of an anæsthetic; he, however, adopted neither of these prescriptions, and now desired my opinion for the second time. After examination, I firmly asserted that the defect would wear away, and do so quicker and better by non-interference, and after the expenditure of moderate patience my prognosis was fulfilled.

About four years ago, a lady consulted me with regard to the condition of her knee-joint. On examination, I failed to detect any disease, but there remained as traces of past inflammation, involuntary muscular shortening; and my advice was, to use the joint moderately and extend her patience, and she would certainly be rewarded. She then informed me that a lecturer on surgery attached to a metropolitan university, had twice visited her professionally, at a town some forty miles from here and, that while under the influence of æther, the knee had been manipulated, but with no appreciable gain to the joint as regards the extension of the range of action. After a long discussion she promised to follow my advice and return for inspection in three months, when on her return at the end of the specified period, the last trace of past inflammation had disappeared.

About four years ago, a surgeon residing on the opposite side of the river, brought his nephew, a young gentleman of about nineteen years

of age, to consult me. The patient had come up from the country at his uncle's request, who had first been called to examine the case, while away from home on a shooting excursion—his uncle diagnosed the case to be one of joint-inflammation. The details of his history, specially instructive was this, that the young man regularly, at stated periods, visited the metropolis to be manipulated, while under æther, by a surgeon of good status. After his relative and myself had carefully examined the case, we decided to subject the joint to my routine treatment for inflamed joints, and to return in six months. This treatment was strictly adhered to for the specified period, during which time the joint ruptured and discharged pus through the popliteal space; and after another six months had elapsed, the joint was found sound but ankylosed and fit for use. In this case, the manipulations were conducted under the supervision of one extra-qualified to perform them, yet they did not improve the condition nor slacken the joint.

The preceding cases are a few only of those which I have notes of; if I were to compile all, as well as those retained in my memory, the "cloud of witnesses" would only obscure my argument, as it should not require much evidence to convince, that when joints have been injured or are unsound, treating the muscles of such joints must lead to disappointing results.

To return to the analysis of the essay, the author next introduces the reader to the treatment of sprains. Thus—

"I cannot doubt that some recently sprained joints may be quickly cured, freed from pain, and restored to useful power, by gradually increased violence of rubbing and moving. This method of treatment has many times been introduced into regular surgery; but it has never been generally adopted, or, I think, long practised by anyone. I suspect that it sometimes does no good, and sometimes does harm enough to disgust a prudent surgeon.

"I believe that the best mode of applying this plan of treatment is, to begin by handling, rubbing, and pressing the sprained part and its neighbouring structures very gently. After doing this for fifteen or twenty

minutes, the rubbing and pressing may be increased in hardness, and the joint may be more freely moved, especially in the direction opposite to that in which it was forced by the accident. Another quarter of an hour or more thus spent is to be followed by rougher proceedings of the same kind, till even severe pressure and wide and violent movements can be borne without pain ; and then, in an hour or so, the cure is deemed complete, or so nearly complete as to require only a slighter treatment of the same kind on the next day.

“I cannot tell you in what kind or proportion of recent sprains you may employ this treatment ; indeed, I cannot advise you to use it all, unless by way of trial in very healthy men.”

In the preceding quotation, there is no information that can aid us in settling the question, What may be proper treatment for sprains? If we subtract “I cannot doubt that some recently sprained joints may be quickly cured, freed from pain, and restored to useful power, by gradually increased violence of rubbing and moving :” from “I suspect that it sometimes does no good and sometimes does harm,” there is only a very small remainder, and this remainder in my opinion the author reduces to a cypher, when admitting “I cannot tell you in what kind or proportion of recent sprains you may employ this treatment.” I believe, that the more we know of the etiology of joint lesions the more seldom will sprains be treated by the manipulations of shampooing and passive motions.

To handle, rub, or press the sprained part is to extend the first cause of the ailment; and to force a joint “in the direction opposite to that in which it was forced by the accident,” would be to injure the joint or ligament ; or if this direction of forcing did not thwart, it would delay, recovery, though it might

ultimately increase the strength of the joint couplings, but as they were normally equal to the strain of ordinary use before the injury, these latter sequelæ would be a superfluous gain. As regards the treatment of old sprains by manipulations, my opinion has already been given in an earlier part of this volume.* There are regions in which sprains occur, where the condition of the part sprained is not very easily diagnosed, as the muscular test is not operative; for instance, the articulations of the bones comprising the foot, exclusive of the ankle, and also the articulations of the bones comprising the wrist. When these regions are injured, their condition has to be surmised both from the symptoms present, which are very obvious, and from the abnormal sensation which the patient may be conscious of. I have no belief in a total disablement of these articulations, if they are severally sound, as there may be limitation of motion, nay even displacement, without disablement, so long as the parts are healthy. But no matter if they be relatively in place and the motion good, if unsoundness exists, the part is disabled. The frequent supposition, that total or partial displacement must totally disable the subject of such defects, is by no means confined to the unprofessional. Cartilages, tendons and even joints may not be in normal position, yet if free from inflammation, and the parts healthy, habituation is soon acquired, and even perfect use may be regained, whereas more or less disablement is sure to last so long as the part is unhealthy, even if the structural relations be normal.

* Foot note, see page 21.

That a sprained part or articulation may recover after much rubbing, pressing, wrenching or the performance which is identical in practice, namely, passive motion, there can be no doubt of, but that any of these acts assist recovery, I disbelieve; and any one who is open to reason and evidence must share my scepticism, where we have to deal with cases, suffering from pure injury or with more or less inflammatory tenderness. All reported cases of cures, treated by rubbing, pressing or other manipulations, when their history comes to be analyzed, are found to be cases in which the extra time, during which these performances were acted, was the real factor in perfecting the cure. Here are given a few such instances—

About two years ago, a barrister in this circuit, consulted me for an injury to his foot. I made an examination of the foot and found a slight sprain only and, on my informing him of the nature of his ailment, he expressed himself as being well pleased, as he had feared that the ankle-joint was dislocated by an accident that he had suffered from, about two years previously. He further stated, that the dislocation had been reduced after a seven weeks' displacement, the dislocation, having been overlooked by a metropolitan surgeon, was detected by an unqualified metropolitan practitioner, who reduced the displacement and *immediately* the patient was able to resume the use of the ankle. I had carefully noted the appearance of the ankle and foot, and as it was a splendid specimen of a normal ankle and foot; I made bold to inform him that he never had suffered from dislocation of the ankle or any other part of the foot. He, however, again asserted that he had suffered from dislocation of the ankle which, on its reduction, was so relieved from disability, that he walked away from the operator's residence free from pain. I now, for a few minutes, engaged him in conversation upon other matters, "topics of the day," and gradually reverted to the former injury of the ankle, and before we parted I was able to elicit the

information that, after the so-called reduction of dislocation, he was many weeks partially disabled, although he had previously informed me that the relief followed *immediately* after the manipulations or so-called reduction of dislocation.

About three years ago, a former lecturer on Materia Medica, in the local medical school, called upon me and requested me to go with him and devise some mechanical support for a case of inflamed knee-joint, so as to enable the patient to attend to his office duty, in the centre of the town. On our visiting the patient, we examined the joint and found it had been so successfully treated, that it was perfectly cured of inflammation, but the muscles of the limb were enfeebled. I expressed the opinion that, with the aid of bandaging alone, the patient might go to his business safely; but, dreading a return of his ailment, he was very anxious to have extra support. Thus his medical attendant and myself, devised an appliance to control his knee-joint. Soon after the implement was applied, he visited the metropolis and, while there, consulted one of the wrenchers, who put the knee through the orthodox manœuvres. On his return home again, his medical attendant and myself again visited him, and found the limb in the same condition as it was on our previous conjoint visit. The patient informed us that, at the earnest solicitation of his friends, he had consulted the wrencher, and had submitted to his manipulation, because he informed him that a ligament was displaced.

If any surgeon would debase himself to treat cases *cured*, as being diseased ones, he might probably find it a “short cut” both to a fortune and a reputation, among persons knowing nothing of our art.

About four years ago, an elderly gentleman consulted me, who was suffering from some slight ailment of his knee-joint. As soon as he had introduced himself to me, I recognised in him a gentleman whom I had met about twenty-eight years previously. On examining the knee, I could detect only some slight tenderness of the ligamentum patella and, from my previous experience of this patient, I believed that it was gout, and informed him of my conclusion. He then informed me that he had consulted a female practitioner with some reputed skill in wrenching rubbing, and passive

motions, who informed him that the cap of the knee was displaced 1-16th of an inch. In answer to this, my reply was, "That I thought that the experience which he had gained some twenty-eight years ago, when he had an attack of slight inflammation of the bones of the foot, ought to have made him dubious both of such an opinion and of the treatment which he had latterly submitted to. He was rather astonished at my knowledge of his past ailment. The first time I had been introduced to this gentleman he had just returned to this country after a residence of some years in the Brazils, having strained his foot, the symptoms of which remaining a long time, he consulted several qualified practitioners, and finally an unqualified one. The last of the qualified practitioners whom he had consulted, had performed some form of manipulation which aggravated the local mischief; then he consulted the unqualified practitioner who, having wit enough to perceive the evil done, advised perfect rest, with the use of the filthy rubbish known as a "poultice," and the patient gradually recovered.

Some few years ago, I was consulted by an alderman of this town, now deceased, who was suffering from some lameness in one of his feet. On examination, I found that there was a tender spot on the dorsum of the foot. He informed me that, on a former occasion when suffering from a like disablement, he had consulted an eminent metropolitan surgeon, who, having given his opinion that the parts were deranged, performed some slight manipulations which, at that time having given him ease, he now wished me to repeat. This I declined to do, and it was apparent to me, that my consulter judged me wanting in the knowledge how to cure, what I knew to be, a slight attack of gout by manipulations!!

The next paragraph of this essay on bone-setting specially instructive is this—

"Among 'old sprains,' you will find a strange variety of cases—chronically inflamed joints, each probably bearing the marks of the constitutional disease or unsoundness of its possessor, and loose joints, and slipping, and creaking, and weak, and irritable joints, and many more. To all these, mere bone-setting does harm, or no good; and rubbing and shampooing are of little, if any, use; indeed, to a really inflamed joint they would generally be mischievous."

As the foregoing quotation includes nearly all the ailments that articulations are liable to, then here, according to the author, the performances known as bone-setting or passive motion, and rubbing, pressing and shampooing are not legitimate modes of relieving injured or diseased joints.

The next subject discussed is that of "hysterical joints," and with the opinions of the author, of this remarkable essay, on this subject I agree. For, indeed, in such cases, whether they be interfered with or not, the advent of recovery will neither be delayed nor hastened. It is my opinion that the term "hysterical joint" is misleading, though the use of this designation may not lead to any injurious practice. For, when the condition which has been termed "hysterical joint" is apparent, there is no true symptomatic evidence that the state of the joint is the exciting cause. The difference between an hysterical joint and an articulation unsound is this, that the infallible signs of an unsound joint are absent, while the uncertain or secondary signs are very prominent. Unsound joints have in past time been often diagnosed as hysterical ones, while the latter have been often diagnosed as diseased ones. The latter error is oftener committed by unqualified practitioners; while the first error was often committed by experienced surgeons, before a trustworthy method of testing an articulation had been found, and, when this mistake was made, the case would generally drift into the hands of unqualified practitioners who would dawdle with the patient until from

the length of time expended, the disease would be thus cured, rather than from any treatment that had been given in the direction of resolution. We know well how frequently the last used remedy is falsely credited with the cure of a disease, when our better knowledge informs us that none of the remedies employed has aided the cure. Of this fact I can give what was to me a humorous example.

Some ten years ago, accompanied by my nephew, I was returning home along one of the main thoroughfares leading into town. On stopping at a "toll bar" to pay the toll, I was asked by the keeper if my name was Mr. ——. On my answering in the affirmative, he further inquired if Mr. —— was my father, to which I replied, that the gentleman he alluded to, was my father. This latter information seemed to greatly please him, and he addressed me thus, "Ah, I thought you were Mr. ———'s son." "Look at this knee, sir. I consulted the London doctors, Edinburgh doctors, Whitworth doctors, Oldfield Lane doctors, and *last of all* your father and he cured me." I surveyed him for a moment from the seat in my carriage, then congratulated him on his recovery, and drove away. Some few years after, when passing through the toll-bar, I was informed by a female, who opened the gate, that the toll keeper was in bed sick, and that he much desired to see me. I alighted from the carriage and went in and found him dying from a malignant disease in the neck. Now I had an excellent opportunity to examine the limb and found that the knee-joint, which many years before had suffered from disease with suppuration, had evidently run a course unaided by art—recovering with the knee ankylosed at an obtuse angle, and that the last practitioner whom the patient had consulted had been credited with the cure. Indeed, if we consider the long journeys this patient must have performed, to enable him to consult all the gentleman he referred to, we may reasonably conclude that, if he had consulted neither of them, he might have recovered sooner than he did.

The concluding portion of the essay is reproduced here in full:—

"From all this, you may see that the cases that bone-setters may cure

are not few. I think it very probable that those in which they do harm are numerous ; but the lessons which you may learn from their practice are plain and useful.

“ Many more cases of injured joints than are commonly supposed to be thus curable may be successfully treated with rough movements—wrenching, pulling, and twisting. The cases that are thus curable I have endeavoured to point out to you. Be on the watch for them. But remember always that what may be treated violently may be treated more safely and as successfully with comparative gentleness ; and that, in some cases, you may very advantageously use chloroform or ether. And remember, also, that no degree of violence, not even such movements or exercises as I have advised, can be generally safe in the treatment of injured joints, unless when directed with a skilful discernment of the appropriate cases.

“ Learn then to imitate what is good and avoid what is bad in the practice of bone-setters ; and if you would still further observe the rule, *Fas est ab hoste doceri*, which is in no calling wiser than in ours, learn next what you can from the practice of rubbers and plasterers ; for these also know many clever tricks ; and if they had but educated brains to guide their strong and pliant hands, they might be most skilful curers of bad joints and of many other hindrances of locomotion.”

The conclusions arrived at by the author, and summarized by him in the last portion of his essay, are not in harmony with the tone of our predecessors in surgery or with the tendency of their practice. Up to the date of the publication of this essay, surgeons did not generally believe, that there were cases which bone-setting might specially aid ; they doubted the probability that anything could be learned from untrained practitioners ; they were not inclined to think that rough movements assisted the recovery of injured joints ; they also thought that by the use of anæsthetics more violence is tolerated at the time, but that

more injury also may be done during this tolerant condition. This essay has almost totally changed the surgical opinion of the past, in regard to the subject which it treats of; as indeed we might naturally expect on account of the never-questioned professional ability which we all know the author of this essay to be possessed of. My criticism of the author's "new departure in surgery," the reader should recollect, has only been the placing, in contradiction to his schism, the faith as handed down to us by the fathers of our art, as I firmly believe that their teaching, so far as they had progressed, was true.

My readers, if they should admit the reasonableness of the theoretical objections to the teaching contained in the essay "On Cases that Bone-setters Cure," may yet be hindered from coming to any decisive conclusion, from the fact, that no person has yet questioned the interpretation that has been placed upon practical examples of bone-setting, manipulations, or passive movements of joints, a set of terms and designations which convey to me the same meaning. To remove from the reader's mind all reasonable objections to the views I have contended for, it is not possible for me to avoid noticing some of the supposed examples of cure by performances, which I believe, from personal practice, to be injurious, and by the setting aside of which, a better success can be gained. Since the enunciation of, what I hold to be a schism, there has appeared, almost yearly, a rotation of practical examples in support

of it, but they have all been only cases of cures either from lapse of time or at most curtailment of time or examples of modification of deformity, such as an alteration of a limb from a crippling to a useful form. I shall notice three of these contributions to the practical part of the question. The first deserves notice, as it appeared to the profession in the light of a supplement to the essay which first led some of us astray; the second will be noticed because the title, text and examples of practice are all at variance with each other; the third deserves notice, inasmuch as it shows that this schism has a footing even among surgeons in the New World. I fear that my criticism will be far from convincing to the reader, as the cases to be animadverted on are often given after frequent "translation" from several parties to the reporter. Upon such a transmitted report, it would be difficult to refute a case, even if it equalled the marvellous in all its details.

The first paper, which I will try to analyze, is that published and titled, "On Manipulation, or the Use of Forcible Movement as a Means of Surgical Treatment."* The cases reported are introduced by some preliminary remarks, which show that like most converts he is not so discriminating as his teacher. Fifteen cases are given.

† Case I.—A. B., aged 17, suspected hip disease, could bear no

* St. Bartholomew's Hospital Reports.—Art XVIII.

† The cases will not be here reproduced in full, but will contain only salient points in their clinical history.

weight upon the limb, slightly flexed, abduction and external rotation, pain on movement, no swelling. On careful examination the hip-joint was found sound, supposed case of strumous periostitis of the innominate bone, rest advised for three months, blisters and oil, at the end of this time no better. Now consulted a bone-setter, who reduced a supposed dislocation, a snap heard during manipulation, "patient could now move his limb freely and walk upon it with only slight pain, which disappeared in the course of two or three days and left him quite well." Just twelve months after, he was asked to cut bread, and while in the act of rising quickly, he was suddenly attacked with his old trouble, "limb locked, &c.," he was brought to London at the end of a fortnight, limb was stiff, flexed and abducted, movement of the limb brought on spasmodic contractions, much night startings and twitchings of the thigh. He was now placed under the influence of gas and the normal motions of the joints gone through. When the patient recovered from the gas all his symptoms had disappeared, and *in a few days he lost both his lameness and pain.* "It must have been an instance in which one of the deeply placed muscles or tendons had on a sudden movement slipped out of place."

Case I, appears to me to resemble very closely the "hysterical hip-joint," all the signs of the disease being present except the one to be detected only by the flexion method. The second-hand report of cure by the bone-setter is simply worthless, in the absence of an expert as a witness, and I dare not suppose that the author of this paper was a party in the farce. The report of this case contains a candid admission of one error in diagnosis, and I think a second error was made in supposing that it was a case of slipped tendon. When evidence is wanted to justify an important change of front in surgery, the evidence should at least look as if sufficient. My reasons for believing that this case was an example of hysterical hip-joint are the following :—

Surgical experience does not teach us that tendons in con-

nection with this joint, if they slip, lame the subject of the defect. Again, the violence practised with the joint while this patient was under the gas, shows us that there certainly was no disease present in the articulation, otherwise there would not have been so pleasant a termination to the performance. Further, local treatment never appreciably seems to influence, for the better or worse hysterical affections simulating articular disease, and in these ailments even violence, though intolerable to the patient's feeling, never seriously injures the part. I know that the joints prone to be interfered with, from what is termed hysteria, are most frequently the knee-joint, next the hip-joint; for one case of hip-joint with such symptoms, there are to be met with fifty cases of knee-joints in such a condition. This ailment is very rarely to be met with in other articulations.

Case I, would probably have been rectified sooner or later, no matter what surgical or medical treatment the youth might have been subjected to, provided, nothing was done to injure his general health. As illustrating this, I will relate, some of my own experience of simulated articular disease.

Some few years ago, I was attending a girl, aged 18, a neighbour of mine, suffering from nervous prostration, consequent upon shock caused by the death of her father, who had been a cabinet-maker. During her ailment she commenced to walk lame, and an examination showed that it arose in connection with the hip-joint, which appeared to be inflamed, but, on applying the flexion-test, it was demonstrated that it was simulated only. This diagnosis influenced me in deciding not to practice any local treatment, but to attend only to the general constitutional state. However, the lameness continuing, an eminent physician was called in to assist me with his advice. He, after an examination of the patient, was

inclined to the opinion that hip-disease was present, but deferring to my opinion, we advised a change of air for the patient, along with medicinal treatment. Soon after her retirement to the country she, in addition to her lameness, gradually lost the power of distinct articulation. During the period of her lameness, she was never confined to the couch, but while in the country she went out daily in a perambulator, and, on the first days of the week, went to worship by the same mode of progression. On one of these visits, she made a desperate effort to join in the singing, and succeeded, her voice being suddenly restored, and, what was quite as wonderful, the lameness also disappeared. This case would be fair evidence for giving credence, and place in surgery also, to the practice of the Bethshanites.

Three years ago, I visited a suburban village about five miles from here,* to meet the family practitioner of a reverend gentleman, whose daughter was disabled by some defect of her knee-joint. On examination of the joint, there were some of the signs pertaining to disease of the part, but the pathognomonic signs of the disease were absent, so we concluded that this was a case of simulated knee-joint disease. Some few years previous, when the patient's age would be about eleven years, she had been sent home from a boarding school, the surgeon to the establishment having pronounced her to be suffering from hip-disease. I was at that time invited to examine her, and found none of the true signs, and expressed to her parents the opinion that it was one of simulated hip-disease, and strongly advised that they should abstain from all treatment, which advice was followed, and in three months the patient was well again. However, on this second occasion we decided to fix the knee-joint as a probable assistance to early resumption of use of the articulation and, also, in order to leave no excuse for something else being done that might be harmful, or, if harmless, might discredit us both, as the parents were surrounded with temptations in the form of friendly advice. This patient soon recovered from this second hysteric attack.

The next evidence bearing on the effect of manipulations of joints is this—

Case II.—Girl, aged seven years, lame six months, with mild attack of inflammation of the hip-joint, “limb considerably drawn up, no pain or other symptom of still present disease.” “Her hip was said to be ‘out,’

* See page 85.

and was 'put in' under chloroform, the immediate result was satisfactory, for the limb was now very nearly straight." "In the course of three weeks after, pain and startings, and restless nights came on." Three months later there was considerable flexion and a large abscess in front of the joint.

This case is another very questionable testimony in favour of the views I am contending against. When a sick man is coaxed out of bed to "record his vote," the immediate result is very satisfactory to the parties contending for supremacy, but the sick voter has to suffer for this act. So in this case the manipulators were the gaining party, but not in better knowledge, I fear.

Case III, is that of a boy, aged seventeen years, standing hip-disease, treated by manipulation.

Case IV, is a patient, aged sixty years, with malignant disease in the pelvis, treated by wrenching.

Case V, was a patient with large sarcoma of the thigh, preparations for the orthodox twists, but the proceeding was declined.

Case VI.—Angular curvature treated by manipulation, death at the end of about two weeks.

It is beyond my comprehension to understand the purport of reporting the six preceding cases in a paper published with the intention of introducing the practice of manipulation into the surgery of joints. Possibly they have been reported, as evidence, to show that much discrimination is required in selecting proper cases for manipulation. Indeed, the author hints that they are the errors of unqualified persons, but a further perusal of this paper shows that most of the cases

which he cites, as well as those he reports, are nearly all examples of errors by qualified men.

After Case VI, the paper is devoted to the enumeration of the kinds of articular defect, which the author believes to be suitable for treatment by manipulation, and cites several examples, for instance—

“A gentleman fell while hunting, and dislocated his humerus and bruised all the soft parts around the shoulder very severely. The dislocation was reduced, but he came to London two months afterwards with the limb almost absolutely stiff. He was told that, if he took chloroform and had the adhesions broken down, he would regain movement at the joint. He submitted, but in the course of a week the limb was as stiff as ever. He was then informed, that the operation must be repeated, and that then he would certainly find his arm cured. Again he submitted, and again complete stiffness soon returned. The opinion was now given that he must make up his mind to a stiff limb. But as he was much given to field-sports, and was still in the prime of life, he determined not to accept this verdict without appeal, and consulted another surgeon. His arm was again moved, and he was at once placed under a rubber and shampooer, who continued his offices for about six weeks. At the end of this time the stiffness had almost completely disappeared; and when I saw the patient (for the first time) five years afterwards, no trace of the accident could be detected.”

Here we have graphically described to us a case, in which the last practitioner gained the credit of curing the patient; all those, whom the hunter consulted, unwittingly worked hard to thwart his recovery; but, from what are obvious causes they all failed. If this gentleman, after the reduction of his dislocated shoulder, had avoided all practitioners he would have been well much sooner, and have passed a pleasanter period during recovery,* The next case reported is that of

* See Shoulder-Joint Disease and Injury of the Upper Extremity.

“A woman, aged sixty-two, had dislocated her shoulder. The dislocation had been reduced, and the limb kept bandaged to her side. When she was first seen at the Hospital, the whole limb was stiff from the shoulder to the fingers, and was very painful when any attempt was made to move it. Gas was administered, and the limb was carried through all its natural range, and then daily shampooed, moved, and douched. In about a fortnight she had lost all her pain, and had acquired *almost* completely the functions of the limb.”

This last case looks very like conclusive evidence that manipulation in this instance must have aided the restoration of useful power and motion to the joint; but the difficulty which presents itself to me is this, of what value is the report of success in this instance, when given to us by a gentleman who, in the same page, cites another case of shoulder-joint defect, with details that convince me that he is unacquainted with the signs of unsoundness in this joint. We accept, as a fact, that “In about a fortnight she had lost all her pain and had acquired almost completely the function of the limb.” Even so—this is not evidence that the manipulation was needed, nor does it properly convey to us the information that the patient was, beyond doubt, relieved of all disability by the manipulations. Another case of injury to the shoulder-joint is referred to, but as the original reporter appears doubtful of his diagnosis, it is rather far-fetched evidence.

The next reported case is—

Case VII.—Mr. A. B., while stooping, being suddenly seized with tearing pain at the insertion of the tendon Achilles, rested a few minutes and the pain disappeared. In one hour after, he was again disabled, and the pain

again left him suddenly. This ends the case ; he was relieved on the first occasion by a muscular effort ; on the second occasion after walking twenty steps.

May we take this as proof that no manipulating is as efficacious as manipulation ?

Case VIII.—Fell nine feet through a trap-door, alighting on his feet, then followed severe pain and swelling, extravasation of blood in the muscle of the calf. A month after, the ankle was perfectly cool with slight puffing at the sides of the tendon Achilles, the joint quite stiff and the patient could bear no weight upon the limb. “The foot was freely moved under gas, and in a few days the patient returned to his business cured.”

This case may possibly be an example of the successful aiding by manipulation of a crippled joint. So may the next.

Case IX.—A man, aged forty-one, slipped and sprained his ankle, was confined to bed three weeks ; at the end of this time could walk only with two sticks, the ankle remaining, month after month, shapeless from chronic swelling. Nine months after the accident, when the reporter saw him, the joint was stiff, shapeless and weak, free from heat, and the foot in the position of slight equinus. When he inhaled gas, manipulation was performed. The patient walked about the same afternoon, left hospital in two days, with slightly stiff joint, with trifling lameness. A week later reported himself well.

It would have been more satisfactory if we had been informed by the reporter of this case that, in a week after, when the patient presented himself, he, after examining and noticing the absence of certain signs, had come to a firm conviction that the patient had been relieved of a defect in the joint, which also from evidence present was perfectly sound.

The next example given is that of a person with a rheumatic diathesis, and, as we know that a slight injury will in such a subject sometimes induce, in the part injured, a severe attack of this disease, which may quite overshadow the effect of an injury, it may be fairly concluded that this was an instance of rheumatic inflammation in the joint.

Case X.—A man, aged forty-eight, who had big knuckles and distorted fingers from rheumatic gout, fell and sprained his ankle slightly, was laid up two weeks, then could go about with two sticks, and at the end of two months came to hospital with their help. On examination, the joint was free from abnormal heat, slight swelling of ankle, tenderness at the instep. He took gas and the foot was moved in all directions, on extreme flexion a loud snap was heard. Same afternoon he walked about the ward without a trace of stiffness, and in a day or two went home. Three weeks after he returned with gout in the other ankle.

This case, again, appears to disprove my views, but experienced surgeons, when they are informed of wonderful recoveries in cases of rheumatism, listen with much the same quality of patience that a sailor does, while a wonderful “fish story” is related. Is there any remedy that has not been reported to have sometimes failed or succeeded in relieving rheumatic affection, whether general or local? I could relate several instances of very rapid recovery in rheumatic affection of the joints by what appeared useless treatment. For instance—

Many years ago a gentleman, an intimate friend of mine, now deceased, was laid up with rheumatic gout. I had been attending him a long period, when his mother came over from the country to visit him, and soon after her arrival induced my patient to try a poultice of cooked potatoes. This application appeared to act like a charm, for the gentleman who had been

confined to the couch many weeks went to business within a period of a week after the application of the poultice. He was much pleased with the success of this amateur treatment, and informed me, in by no means a pleasant manner, that in future he could resort to this remedy, should his old tormentor return, and thus dispense with my professional services. Before long, his old ailment reappeared, but the remedy from which so much was expected proved worthless.

This case brings to my recollection another such case, that of a gentleman, who indulged very freely in eating and drinking, in the latter to an excessive degree. He also was the subject of occasional attacks of rheumatic gout. The cause of his frequent attacks by the malady was explained to him by myself and his friends and he very sensibly decided to reform his habits. One of his friends was able to add his own personal experience of the benefit to be gained by the practice of moderation in food and abstinence from intoxicating drinks, but he also added that to make certain of the non-return of the gout, he had always carried in his trousers pocket a raw potato, an infallible preventative. My patient adopted this advice also, and during the remaining portion of his life, often assured me that the raw potato was an excellent preventative of the gout, and that he had met many with the same experience and conviction as his own.

The next case is recorded with very meagre details.

A female, aged forty-eight, fell and injured the knuckle of her middle finger. Her hand was kept at rest in a splint and cold lotions applied, part however remained painful and disabled, with swelling about the knuckle. The reporter saw the patient twelve weeks after the accident, and found the finger stiff, painful on movement, with heat which increased towards evening. The finger was bent to full flexion under gas and moved latterly. "For several days the joint remained very sensitive, but not painful, and seemed very little better for treatment. But in a week it had grown quite cool and much less sensitive, and she could use the hand for dressing herself and lifting light objects, which she had been unable to do since the accident. I saw her a month later, when she reported the finger as *being very nearly sound*."

To enable any critic to fairly estimate the value of this case in relation to any method of interference, further information is

wanting. Had the practitioner in attendance given permission to the patient to try and use the finger? and if he had, did the sufferer persevere in trying to bring about the normal motion of the joints by her own efforts? Again, What does the reporter mean, "I saw her a month later, when she reported the finger as being very nearly *sound*." It is highly improbable that any trained practitioner would go so far as to contend for the introduction into our practice of the manipulating of unsound joints, as a mode that would favour the progress of such a joint towards the sound condition. This case, as reported in this paper, is obviously worthless, as testimony in favour of reversing our past practice, and the following one is equally so.

Case XII.—A female, believed to be thirty or forty years of age, wrenched her knee two years ago. The joint was painful, hot and swollen for two weeks, but after that seemed to have recovered, but painful when full flexed; could walk long distances without inconvenience. She took gas and was manipulated, no pain or trouble followed this operation, this did not remove the pain, but only diminished it. Two months after some pain remained.

I fail to see that this case in any way, relates to the subject-matter of a paper written to show, that manipulation ought to be introduced into surgical treatment.

Case XIII.—A girl, ten years old, suffering for twelve months, from morbus coxæ without suppuration, but about the fourteenth month "acute symptoms occurred," after which she went about on crutches. During this period she had a fall, which induced much pain, but it passed off in a few days; and as the result of the accident HER MOTHER *found that the limb was nearly straight.*" On examination, ten months after the accident, there was only slight flexion and free movement of the femur.

This case is second-hand information—what the mother, an unskilled person, is said to have noticed ; if it is contrary to our experience, then it may fairly be suspected. The next case is another example of second-hand evidence.

Case XIV.—A lad, had his elbow locked a long period, the result of an injury. But finally when playing with some other youths he was caught by the hand and jerked ; he had severe pain, but soon discovered that he had regained the power of completely extending his forearm, and the stiffness never returned.

Surgeons are often informed of occurrences similar to the preceding ones, but to establish them as facts, from which to deduce a rule of practice, such cases require to be reported by experts who have examined them both before, as well as after, the sudden and supposed successful amelioration.

The last link in the chain of evidence brought forward by the writer is this—

Case XV.—A man, seventy-two years old, had injured his shoulder-joint six weeks previous to visiting an hospital for advice. His limb had remained stiff and painful, could not raise the arm from the side, movement of the shoulder-joint very limited, no heat, and no swelling. “When he had inhaled gas I moved the limb freely in all directions, first practising rotation of the humerus in the glenoid cavity, and then bringing forearm across the chest, raising it to the head, and carrying it backwards. On recovering consciousness, the patient could move his limb, though with much pain, and in the course of a fortnight reported himself cured.”

The best comment I can think of making upon the last case is to record here two instances of shoulder-joint defect, the treatment of which I witnessed some thirty years ago. These cases at the time, created in my mind some doubt as to the propriety of manipulating joints in similar conditions,

and other like cases, which I have witnessed or treated since, have only confirmed my surmise. The manipulator was one with a very wide reputation for skill, and I can prove that, except in the treatment of unsound articulations and in cases where the total signs of disease were present, he had wit enough never to try manipulation. He was in the other subjects, which he professed to practise, much the superior of his qualified contemporaries in dexterity and practical knowledge.

In the first case of them I was present when the patient, suffering from a defect of his shoulder-joint, was introduced to the manipulator. His introducer was the principal partner in a large printing firm, whose works were adjacent to a railway station, of which his patient was station master. The gentleman, who accompanied the sufferer, impressed upon the attention of the manipulator the facts, that the patient was the oldest station master in the world, that he was very well known, and he as well as several other influential gentlemen were anxious that the manipulator should successfully treat the case, as many others apparently better qualified had failed. Now I witnessed the examination of the shoulder-joint, which was stiff, painful, atrophied, and permitted only limited motion. The manipulator pronounced the joint mechanically defective, and to remedy this, firmly moved the arm in the various directions in which the upper extremity is used habitually, at the same time fixing the scapula; this was done by the left hand grasping the lower end of the angle, and the right gripped the elbow while in a state of flexion. It was done effectually, and the patient and his companion were delighted with the result, but not more so than I was at what appeared so simple yet so efficacious. I was present at several subsequent consultations, and noticed that gradually all traces faded away of the coveted success and amelioration of the patient's condition.

The second case was that of a brewer's drayman, who had some crippling defect of his shoulder-joint. He was sent by the firm which employed him to consult the well known manipulator. His previous history was, that he had consulted several surgeons, but last a surgeon of exceptional knowledge and ability (now living but retired from professional

work). All of these gentlemen had concurred in the opinion that the patient's shoulder-joint was mechanically perfect. I witnessed the examination of the articulation, and recollect well that the case appeared similar in all respects to that of the station master. The same operation and the same subsequent treatment were followed with like result—much satisfaction to the patient at and for a short time after the operation.

Both of these patients were solaced by the suggestion, that had the procedure been performed earlier, a better result would have been expected.

The author of the paper "On Manipulation: or the Use of Forcible Movement as a Means of Surgical Treatment," concludes the paper with the following remarks:—

"It only remains to point out how the foregoing remarks and cases apply to the everyday practice of surgery. I think it is proved that bone-setters cure a number of cases many of which have previously been under surgical treatment without relief. Our knowledge of this subject seems to have arrived at a point from which it is easy to see that forcible movement, with its accessories of shampooing and douching, is a more efficient means of treatment, and more frequently useful, than has been hitherto believed; that in a large number of injuries, and often after inflammations, this method is capable, whether by the rupture of adhesions, the adjustment of displacements, or by the mere rousing or movement of muscles, of removing stiffness and relieving pain and the patient's sensation of weakness in the part; and that in many nervous affections, whether they come under the heading of hysteria or of nervous mimicry, the treatment will effect a cure, probably by the strong mental impression which it makes upon the patient, whether of fear or of strong belief. I need not try to group in a single sentence all the cases which are appropriate for this method—these may be gathered from the authors I have quoted and from the examples I have given. Neither is it necessary to repeat all the precautions with which alone it can be safely practised, for these all surgeons will understand."

Whatever quantum of knowledge the author of this paper may possess with regard to the etiology of the ailments of

other joints, he certainly has only a modicum of it, as relates to the abnormal conditions which cripple the shoulder-joint. On very many occasions I have had the opportunity of witnessing the effect of manipulation, when practised for the relief of crippled shoulder-joints, performed by both qualified and unqualified persons, and have also frequently, in times long gone by, tried this treatment myself; but as my knowledge of the ailment increased so my treatment deviated, until my latter experience compelled me to reverse my practice.*

The argumentative portion of this paper is very misleading. How could it be otherwise? Based as it is upon a misinterpretation of even the fifteen exceptional cases presented to us as a ground for the argument. In my opinion, the author of the paper "On Manipulation: or the Use of Forcible Movement as a Means of Surgical Treatment," has rendered us palpable service by the publication of his paper. He has shewn that our theoretical knowledge is bad — our treatment worse; but his suggestions relating to the treatment of crippled joints would, if adopted, lead us still further astray.

* The reader will perhaps attach a little more weight to my opinion, if informed of the number of shoulder-joint cases which came under my observation, on the "very many occasions." I suppose one hundred such cases ought, unless the observer is very dull of comprehension, to be reasonable evidence for or against the use of manipulation to relieve stiff shoulder-joints. There are gentlemen in our profession, fellow citizens in particular, who know that my conclusions, whether right or wrong, have been arrived at after having observed not one but very many cases. Indeed, I must have had very numerous opportunities, ere I had the slightest suspicion that the practice here condemned was wrong. For many years I believed it to be *essential* treatment, leading to early and complete use of the crippled part.

The next contribution to be reviewed relative to the propriety of resorting to manipulation as a means of relieving stiff joints, is one entitled, "On Anchylosis and the Removal of Deformity, and the Restoration of Mobility in Various Joints,"* and written by a specialist. This is one who is popularly termed a bone-setter or bone-doctor, but really a qualified practitioner. Cases are recorded by the author both as evidence of the restoration of motion, and of the correction of unpractical forms of various joints. The cases reported may here be divided into two classes; those in which motion returned to the stiff joint despite the treatment, and in some instances would have recovered perhaps earlier without interference; and those cases in which the surgeon succeeded in changing the limb from a useless to a useful form. This last feat is not new information to the surgeons of the present day, nor would it have been so to their immediate predecessors. Why these latter class of cases were published at all, I fail to surmise, except it be to inform the profession that the author is able to do what his contemporaries are also able to perform.

In the introduction to his volume the author informs us, that twenty years ago he first brought before the profession his views on the forcible flexion of ankylosed joints. As preferable to movement in the direction of extension, flexion first, then gradual extension, appear to be the author's practice, and he applies this rule to all joints.

* Broadhurst,—Churchill & Co., New Burlington, W., London.

“The same mode of treatment was also advocated for other joints similarly situated.”

Some eighteen years ago, I studied the contributions of this author, on the subject of ankylosis, and tried his rules in practice, but soon saw my error and shortly repented.

This writer makes three demonstrable errors. *First*—He supposes that, what I term, false ankylosis never passes away spontaneously. *Second*—That flexion of a joint is the key to the reduction of deformity. *Third*—That no inflammation is induced by the operation of correcting a deformity. In opposition to all these I contend, that when sound ankylosis has once been gained, the form of the limb cannot be altered without the induction of some degree of unsoundness, though in some cases it may be imperceptible, and that false ankylosis, with the meaning I attach to the term, may spontaneously terminate with restored motion. It is also my contention, that in most cases extension, either sudden or gradual, or both combined, will alter deformities. If extension fails, then flexion or any strain, that overcomes the resisting part and deteriorates temporarily the part, enables gradual extension to succeed. Again, there are to be met with, cases which neither forcible flexion nor extension will strain sufficiently to damage the abnormal junction, and when severance only will enable us to triumph over the resisting force, and afterwards to complete the correction.

That the author, in some of his reported cases, restored motion to the joint, in which, previously, there had been true ankylosis of a bony character, is probable, by the advent of fracture during the manipulation and subsequent non-union—easily induced in persons whose stamina had already been severely tested by the antecedent ailment, and thus, by bringing about a defect of one character, partly remedying that of another, but greater defect. We are presented with twenty-five examples of cases which he believes, to be the “Removal of Deformity, and “Restoration of Mobility in various Joints,” by interference, and he appears to me to desire to convey to his readers the opinion, that without the special interference employed, all or at least most of these defective articulations must have remained so. Hoping to aid in the introduction of an improvement in our practice, it is my purpose to try and show by criticism that there is a principle of practice, not generally known, applicable to the treatment of ankylosis and deformity; and, further, that we often take credit, both for the correcting of a defect and the resolution of a disease, to which we were not entitled, the case often having run a course of spontaneous cure. The reports of practical examples are prefaced by an “Introduction” followed by Chapters on Diagnosis, Pathology, and the Theory of Treatment. In the “Introduction” the author instructs us regarding the treatment of deformity by gradual extension.

“I have known instances in which the so-called treatment had been continued for years, even ten years, without alteration in the position of the limb.”

If he said that extension had been persevered in for sixty years, I would have believed it, for it is quite possible where a special condition exists. But the author gives us no clue as to the cause of failure; but, further, indirectly makes known to us that he is not cognisant of the cause of failure. For instance—

“The adhesions in ankylosis of the hip cannot, except when they are quite recent, be ruptured on extension of the limb, nor can they be affected in the slightest degree by gradual extension.”

“Passive motion, with or without anæsthesia, or in the hot-air bath, when considerable muscular relaxation has been obtained, will in a large number of cases be necessary to restore mobility.”

This teaching is erroneous, as the resisting power of the organized matter restraining an articulation, does not depend upon its age but mainly upon its quality; if there exists a vast amount of adventitious matter, of a very unhealthy character, its resisting power may be very feeblē, whether it may have been many minutes or many years forming.* If very unsound, mere fixed reclamation may overcome them. The more the so-called adhesions or restraining parts progress to a final development with health, the greater the strain which they can resist. If perfectly formed and sound they may withstand all the leverage possible of being exercised, without damage to other parts. Once the articulation is sound, its

* Case XIII.

surrounding structures become sound also, and the muscles in charge of the articulation cease their intelligent conservative control, and respond to the will of the patient in the direction of using the joint. If the limb, during treatment, has been retained in an useful form, then the joint may spontaneously and early resume its temporarily suspended action, but should the joint, during treatment, have been retained in a position which, on its recovery, does not admit of the patient making use of it, then the spontaneous return of motion may be very long delayed.

The author refers to some *post-mortem* experiments as supporting his theoretical teaching,* but this evidence cannot be accepted. In the debates held, during late years, relative to the treatment of articular disease, a too mechanical view of the question has been generally adopted. The presence of vitality in the body is a factor in aiding us to mechanically correct even mechanical defects; as eccentric forms, that cannot be altered in the dead body, without rupture or fracture, can, during life, be altered by mechanical influence, as time and physiological action will commode the part to the direction of the employed force.

At page 44 we are informed that

“No time should be lost in gaining whatever motion is possible after the extending process is complete; *for diseased action* may re-commence if the limb be allowed to remain permanently in one position.”

The twenty-five reported cases do not, in my opinion,

* A System of Surgery, by T. Holmes, page 718, vol. iii.

satisfactorily support, either the principles of treatment laid down in the preceding quotation, or the teaching which pervades the whole volume.*

Case I.—Aged 23 years. Diseased knee-joint, angular deformity and Posterior luxation of tibia with multiple sinuses, “no appreciable motion at the knee, no weight could be borne on it;” treatment chloroform, divisions of hamstring muscles, forcible flexion, and at the end of a week gradual extension. “Before he left he walked about his room freely and without a stick, and with a stick walked round . . . having gained considerable amount of useful motion.”

This was an example of unsound ankylosis, with the joint in an unprofitable form, treated by a tedious and roundabout method—the division of tendons and forcible flexion not being necessary, as the state of the articulation indicated a minor power of resistance in the structures restraining the articulation. The division of tendons and forced flexion also necessitated a week’s delay, as the part defective was unsound, so the same result would have followed had gradual extension only, without chloroform, been adopted at first. We are not informed how much time had to be expended before the patient “gained a considerable amount of useful motion at the knee-joint.” Neither do we find that passive motion was practised, consequently, the gain from “no appreciable motion to useful motion” was acquired from the primary false or unsound ankylosis improving by treatment, so as

* The historical *resume* of wonderful cures of diseased joints and corrections of deformity contained in this volume, I have purposely ignored. What we want is not to know that exceptional cases were relieved, but whether there be a rule applicable to all cases, so that none may have to trust to chance for a cure.

to become healthier; and motion being tolerable to the joint, more of it was gradually acquired.

Case II.—Aged 19. In the fourth month of 1876, fracture of right femur into knee-joint, left femur fractured at lower third, both treated by the long splint. When the splints were removed the knees were found fixed and immovable. An eminent surgeon prognosed the stiffness to be ankylosis of a permanent character. Nine months after the accident, “ankylosis was not complete in the right limb, in left knee no movement at the joint, patella free; now an anæsthetic was used, and the right knee partly flexed, this operation being repeated five times. The left knee was similarly treated, and repeated on seven occasions; passive motion was continued until the entire and free use of both knees were established—this would be seventeen months after the accident.

This case was presented to the reporter nine months after the twin fractures. Each of them, though not compound, was of extraordinary severity, and during these nine months after the accident, the limbs and their articulation had of necessity been mechanically controlled, as the time expended was only sufficient to consolidate the fractures and make sound the knees, which must have suffered from indirect concussion. Yet, an eminent surgeon was indiscreet enough to prognose a permanency of the ankylosis, and the reporter to suppose that all the signs indicative of permanency were present, provided no interference was employed. Experience has taught us; first, that the probability of ankylosis increases with age, and this patient was not yet of the adult standard; secondly, that when fractures occur and the neighbouring articulations suffer from concussion, the resulting false ankylosis takes, to pass away, double the time which the unsound articulation took to

recover. Had eighteen months elapsed ere the operations for the removal of stiffness had been practised, then, I maintain, there would have been grounds for supposing that the meddling had specially corrected the defect. The utmost that I can admit to have been gained here is a slight curtailment of time. Spontaneous restoration of motion was not permitted.

Case III.—Aged 34. Seventh month of 1876, injured the shoulder-joint with fracture of the coracoid process, resulting in ankylosis of the shoulder, the elbow, the wrist, with ring and little finger. These joints were found ankylosed; two months after the accident, when an anæsthetic was given, and manipulations performed with passive motion, and continued one month, and repeated after an interval of three months, and again repeated nine months after. The case lasted at least sixteen months and was treated by manipulation, and passive motion for fourteen months.

Another shoulder case!! I firmly believe that if the sufferer had paid a visit to the sacred spot of Knock, she would have been well in six months. In fact, there would have been a spontaneous resolution of the injury and its attendant stiffness within that period.

Case IV.—An engineer, during the war in the eleventh month of 1854, was wounded by a bullet in the neighbourhood of the hip-joint, inflammation followed and extended to the hip-joint; was confined to bed for four months, and at the expiration of which time, "It was discovered that the limb was fixed at an obtuse angle and that the joint was stiff." This continued two and a half years. The joint was forcibly flexed under the influence of chloroform, adhesions were ruptured, as shown by the very audible snap heard during the operation. The patient left his bed on the seventh day, and passive motion was commenced in a week after. At the end of the third week he could bear the entire weight of the body on the leg, but motion was slow in being acquired. "However, by great perseverance in the use of passive motion the thigh could at length be flexed beyond a right angle, and could be perfectly extended."

That the patient referred to, in this report, derived some special benefit from the operations must be admitted; for instance, the limb had been retained during primary treatment in a very unpracticable position—which made the advent of the spontaneous regaining of motion both difficult and far distant, as regards time; the operator, by producing an intra or extra-capsular fracture of the neck of the femur, and subsequent non-union, exchanged a great defect for a lesser one. It would have been easy here for me to say what the exact nature of the fracture was, had a more detailed clinical history been given. If it had been an intra-capsular fracture, the passive motions subsequently practised would have led to failure, or to a very long period of recovery. The period of recovery, however, is not given. In the history of this case, it is said that “the hip could be perfectly extended.” However, I gather from the volume that its author is not able accurately to detect the existence of perfect extension—one of the few links that is wanted to the chain of evidence, to establish the wonders passive motion may bring about.

Case V.—Aged 8 years. Injured elbow, with ankylosis of five years duration. Chloroform was given, and the elbow was fully flexed and then extended, but the radius would not rotate. On the following day and every alternate day for a week, “the forearm was moved upon the arm slightly,” after which he was again placed under chloroform, and the radius rotated. After some days passive motion was recommenced. Two months later voluntary motion was almost perfect, so that the forearm could be flexed beyond a right angle.

It is reported that in this case “the movements of prona-

tion and supination were limited," but if the forearm could only flex over the square, the movements of the elbow were also limited, still there was here a great gain. But for this to be evidence in support of passive motion, we should have been supplied also with information, relative to the present condition of the part or its state, one or two years after the operation had taken place. By manipulation and passive motion any tyro can temporarily bring about mobility, but it requires knowledge to guide our skill to bring about both the health and mobility in a joint, which are essential to a permanency of any mechanical change made. Information as to the condition of this patient two months after operation is worthless, except the reporter was in possession of the infallible test, which can point out whether the articulation was certainly tending to an increase or decrease of mobility.

Case VI.—Aged 24. Suffered from gonorrhœal rheumatism of hip-joint, had been confined to bed several weeks (how many not given); however, the case terminated in slow motion at the articulation. On examination, about two years after the onset of the disease, the thigh was found extended with no power of flexion, but with perceptible motion. Chloroform was given and the limb jerked and flexed, and on the third day manipulations and passive motion practised; six weeks after the thigh could be flexed. "To show how sound the joint had become, I may mention that our patient could sit on his heels, each heel being equally in contact with the corresponding tuberosity of the ischium."

The fact, that a person who was or had been the subject of hip-joint inflammation was able to posture himself by bringing in contact his heels and ischiæ, taken alone, would be to me rather strong evidence that probably he was not yet

recovered from the disease, rather than a test of soundness. In this case I incline to the belief that the manipulations and passive motions, brought about a curtailment of time, but it is clear that the joint was not beyond the possibility of spontaneous recovery of motion, as the reporter informs us that there was perceptible motion. Now it may be stated as a rule, that when the articulation is sound and motion is perceptible, more will follow; and we are informed that in this case the limb had been cured in a useful form. The termination of this case shews that the treatment may have been a "lucky hit," not one of a series of those passive motion cases, we only accidentally hear of. Such, for example, were the cases I have referred to at pages 88-9 of this treatise, where the patients had tried every manipulator, qualified and unqualified, in the metropolis and the continent, inclusive of those referred to in the report of these cases, in a fruitless search after relief.

Case VII.—Aged 23 years. Suffered from gonorrhœal rheumatism, "which affected the ankle, knee and hip of left side, right hip, ankle and knee, both thumbs, elbows and shoulders, and the jaw." The jaw and left knee could be moved slightly, in the other affected joints there was no appreciable motion. This condition of his joints had lasted four years. To rectify these defects, as the patient's joints had been treated and allowed to remain in unprofitable forms, chloroform was given and manipulations performed on the hip-joints, the same being repeated afterwards with the addition of the section of tendons. The jaw was treated by gradual extension and opened to the extent of one inch. "In the course of two months the motion of the joint (knee) was perfect."

This case is, clinically, very imperfectly reported, for beyond the expression, "In the course of two months

the motion of the knee-joint was perfect," there is no clue given as to the result that followed the treatment of the other joints by the manipulations; the motion gained by interference with the jaw, it is stated, was not permanent. It is also to be regretted that no information is given as to the health of all the joints before manipulation, which makes the report of this case worthless to general practitioners, like myself, in search of more knowledge of the subject. But it does shew that the reporter is a powerful manipulator, but deficient in art, otherwise he would not so frequently resort to tenotomy to get over some of his impediments.

Case VIII.—Is one of ankylosis of the finger, treated by tenotomy, manipulation and passive motion. "It required, however, longer time to regain the action of the flexor muscle."

Why this case was reported is a mystery. The health of the defective portion is not given, neither is the second item of value, duration of recovery, which would have enabled us to judge better of the merits of the treatment.

Case IX. — Ankylosis of elbow. Manipulation performed. When last seen, three years after operation, perfectly well and motion complete.

Duration of treatment not given. It is useful information to find that in three years perfect motion had been regained, but it does not inform us that manipulations brought it about; ankylosis, that to-day may appear immovable, may, in three years, be spontaneously corrected, if the part is freed from disease.. This has been frequently observed by me.

As an instance, I will relate the following case :—

Five years ago, a corn merchant of this town, aged 36, consulted me regarding a swelling in the groin situated near the inner margin of the tensor vaginae femoris muscles. On enquiry, I was informed that he had been in ill health for many months, and, as I was personally acquainted with him, his changed appearance and my examination of him, showed that his general health was deranged. The examination convinced me that the fluctuating swelling, to be seen and felt at the groin, was an abscess connected with the hip-joint. On my mentioning this to the patient, he gave me some particulars relative to his childhood, which convinced me that, when a youth, he had spontaneously and perfectly recovered from an attack of acute hip-joint inflammation, although, he told me, an eminent surgeon then consulted had given, as his opinion, that recovery without defect was not possible. It caused me some surprise to learn that one, whom I knew to be so perfect and active, was at one period of his life so much in peril of losing the use of his limb. After informing him that his hip-joint was again suffering from disease, he submitted to medical treatment in combination with mechanical control of the lower extremity and aspiration of the fluctuating tumour. This was repeatedly aspirated but, on account of its constantly refilling, it was incised and treated by the open method, and at the termination of six months the abscess permanently closed. The patient was confined to his bed six months longer, after which he got up and progressed with the aid of a walking stick. The posterior mechanical fixation was retained and worn during the next twelve months, after which it was removed, when the joint after testing was found sound and equal to use, but ankylosed, which, as it was equal to the strain of “wear and tear,” was expected to be true ankylosis, that is a permanent one. My patient at this time went to the United States and visited several large towns, and at my request called upon an eminent surgeon in one of those towns to be examined, and the opinion given coincided with mine. On his return home, two and a half years from the commencement of treatment, the joint was still stiff, no sign of motion, but, at the commencement of the third year slight motion was perceptible, and in the middle of the fourth year, 1883, he had regained the power of extreme extension and flexion, no trace of the disease remaining, except the mark of the incision, indicating where the abscess had appeared.

Case X.—Aged 23. Suffered from rheumatism, which left in the right

shoulder some stiffness, duration of stiffness not given. Chloroform was given, the joint manipulated, five days later free motion. "It needed, however, considerable time to restore the condition of the muscles of the arm."

Duration of treatment not given. In this case no sooner was the stiffness of the joint detected than the patient was treated as though there was a mere mechanical defect. We are not informed that any examination was made to elicit whether the parts were healthy and fit for use. This is a prevailing fault with most practitioners, who are too prone to look upon joints as mere machines, that, like watches or other mechanical combinations, are possessed of no automatic repairing quality. The report of the case does not inform us that it was a creditable success.

Case XI.—Aged 9 years. Suffered from hip-joint inflammation for many months, terminating in ankylosis with deformity, the limb one inch short, pelvis oblique so that the heel was four inches from the ground. Treated by the administration of chloroform, when "With a very slight effort the adhesions snapped audibly, and flexion and extension of the limb were immediately perfect." Ere he had properly recovered from the anæsthetic "he leaped from the bed on which he was lying, and rushed in the next room, using the hip in the most natural manner." When last seen, one year after the operation, he could walk three miles without fatigue.

This case was certainly a splendid success, and is one of the many published, during late years, to show the advisability of, in such cases, fracturing or dividing the neck of the femur in sound or permanent ankylosis. To some of the comments appended to this case, reasonable objection can be advanced; for instance, the assertion that, after the operation, extension of the limb was "immediately perfect," is certainly inaccurate.

That much is at once gained, is true; but if perfect extension is desired, even after operative interference and when the limb feels quite limber some days of fixed reclination is imperative, to completely reduce the last fraction of flexion. Again, that the patient leaped and walked about immediately after the fracture is not surprising. A patient in a state of semi-intoxication from æther, chloroform, or any sedative* will, if not controlled, indulge in such pranks, and we cannot accept such as evidence of the benefit of any treatment. The record of this case repeats much that is old and incorrect, without introducing us to anything new.

Case XII.—Anchylosis of hip and knee. The clinical history of this case was similar to that of Case XI, but the knee-joint had also suffered from inflammation, which resulted in anchylosis. Fracture at the hip-joint was effected while under the influence of an anæsthetic.

The reporter of Cases XI and XII, supposed that his manipulations succeeded from the force employed having torn some fibrous adhesions. For many years this was my own interpretation of the “audible snaps.” I have had several opportunities of being convinced to the contrary. The first occasion that I began to suspect this mistake was, when being present at a public hospital, one of the staff, assisted by several others, was attempting to overcome, what was thought to be fibrous resistance about the hip-joint. I heard, what I had often before heard in mine own operations, the “audible snap,” and directly after examined the pliant

* That these are pure sedatives, I have attempted to prove in Part VIII. of this work. Nerve Inhibition, &c.

limb and felt satisfied that there was no fracture, but unfortunately for the sufferer, there was sometime after a *post-mortem* examination when a fracture was found. Any surgeon of moderate experience must know that, in fracture of the neck of the femur, crepitus is not always to be felt, and that sometimes even deformity may be absent during the first few hours.

I remember another such case; it was an anchylosed knee, where much force was employed and the “audible snap heard”—and in fourteen days, on amputation, the femur was found partly fractured above the condyle. I am satisfied that in many cases of the reduction of deformity of a permanent character in the knee-joint, there is often fracture of a condyle, from one of them being anchylosed by bone to the tibia, the other not so.

Case XIII.—Hip-inflammation of three years’ duration. Had *just* recovered from the disease, with the limb in the position of flexion. The deformity was treated by forced flexion and passive motion, the adhesions were very soft and yielded readily. For six weeks after the rupture, there was scarcely any voluntary power of flexion; from this time, however, motion began to increase. This case had been previously treated by a surgeon outside of the metropolis.

To whom is due the greatest credit, to the sailor who has successfully navigated his barque for twelve months, whilst contending with climate, wind, rain, fogs, intricate channels and submerged rocks; or to the compulsory harbour pilot, who probably never was long out of the sight of land during his life? The first did essential work—the duty of the last is never a necessity. The person who undertook to pilot

Case XIII, just missed striking upon a rock ; this case would have recovered quicker, and with a better result, if the limb after the first three years' treatment had been ignored. It would be unfair for me not to admit, that passive motion did influence this case, for it must have extended the period of recovery, and increased the probability of defects remaining.

Case XIV.—Anchylolysis of knee with luxation of tibia backwards, in a patient aged fifteen years, resulting after ten years of disease in the kneejoint, leg flexed at an acute angle, knee covered with old cicatrices ; there was appreciable motion. The treatment consisted in dividing the *hamstring muscles, tense fasciæ and adherent cicatrices*, and after a week's interval gradual extension. "The limb, however, was only partially straightened by this gradual extension," and after consultation, the adhesions were ruptured, "*seeing that nothing more could be gained by gradual extension.*" But before this could be done, the tendons, fasciæ and cicatrices were again divided, and the knee, after rupture of adhesion under chloroform, was replaced in the splint at the same angle as before. On the third day *extension* was recommenced, and continued for two months, when the limb was found perfectly straight. Now chloroform was again given, and the joint forcibly flexed and passive motion repeated daily as much as could be borne. On examination, two years after the above treatment, it was found that "the motion of the joint had diminished somewhat in extent, yet useful motion remained."

This case is a most instructive one. In its management there were several surgeons, and the date at which the incidents recorded happened, is 1854, nearly thirty years ago, and it well represents the surgery of those days ; but it is republished in 1881. Surely the author, a specialist, knows that the details of treatment practised belong to the past. Twice, a wholesale performance of subcutaneous section of resisting media was performed, and the case was delayed a

week, to enable the part to recover from this useless procedure—useless, for on each occasion it was a week spent without gain. Though subcutaneous section of resisting structures was twice performed, the operator, after all, could succeed only by the lawful method of reducing deformity, that is, by the induction and the persistent maintenance of some unsoundness, until the wished-for form of the limb had been gained—a method which is quicker, safer, and more reasonable. Gradual and uninterrupted reclination with or without extension will, in most cases, reduce any deformity, if it is practical to use sufficient force; and when the force required is greater than reclination and extension combined can overcome, then, we can generally, whilst the patient is under the influence of an anæsthetic, by the use of extra force in some other manner so far strain the part as to deteriorate its condition, that reclination and extension may “start off with the load.” Subcutaneous operations in deformity of the knee-joint is worse than useless, as both time is lost and risk incurred. In the report of this case, it is stated that, after the limb had been brought to the straight line, forced flexion and passive motion were exercised. Was any good done by this? Certainly not. The reporter admits that two years after the performance of passive motion, the range of action of the articulation had diminished. This informs us, that both when he dismissed the case and during some portion of the subsequent two years, the joint was

unsound, partly from the very proper attempt at the reduction of the deformity, and, most probably also, from the passive motion having been a hinderance to early restoration of health in the parts that had to suffer a great deal to gain a reduction of deformity. However, "all's well that ends well." But if the joint had been dismissed healthy, the motion which then existed must have subsequently increased if any variation happened. I may mention here a rule relative to the alteration of deformed limbs and of the attendant limited motion in their joints. Whatever motion the soundly recovered articulation of a deformed limb possessed, before its successful alteration, such amount of motion, *at least*, it will most certainly have in its new form as soon as the unsoundness attendant upon the reduction of deformity has gone. If there was none before, then there will be none after; and the part, if sound after the alteration of form, will remain permanently both immovable and unalterable by use.

Case XV.—Seven years of age, had suffered for many years with inflammation of hip-joint, thigh flexed at a right angle with the trunk, and apparently immovable, but under chloroform slight mobility could be perceived, adhesions were ruptured and "the *entire* range of flexion and extension was immediately gained," some pain followed which lasted ten days. "After this time the limb was moved every day, and each day *more motion was gained*. Voluntary power was gradually regained, but the limb remained feeble during many months." After treatment for two years, the thigh could be raised beyond a right angle. Four years after treatment and *six years* from the onset of the inflammation, the limb had almost recovered its natural size, motion of hip-joint perfect, though after "more than slight exercise," drooping of that side was apparent.

This is a case of recovery, despite of interference tending to another direction. A joint that to-day appears hopelessly fixed, if so by false ankylosis, may in six years from now be perfectly limp. Passive motion, in this instance, neither favoured the advent of health in the joint nor curtailed the period of disablement. The next case is very sickly evidence in favour of the reporter's theoretical views.

Case XVI.—Aged sixteen. In 1857 suffered from rheumatic inflammation of hip-joint, when specially examined in twelve months after the commencement of the disease, "there was not perceptible motion at the hip-joint, but some degree of flexion was apparent; chloroform was administered, the joint flexed, during which the adhesions audibly snapped," there was so much rigidity of the muscles of the thigh that motion was unusually painful. "He did not, however, gain all the advantages of the operation, from want of perseverance in passive motion."

This case is candidly reported as a failure. But why did the treatment so very obviously fail? A reasonable explanation can be advanced; the joint-inflammation had existed only twelve months, which makes it very probable that it had not regained soundness, and thus would be utterly unfit to be coerced into functional activity.

Case XVII.—Early in 1854, suffered from inflammation of hip-joint, treated by fixation of the lower limb in line with the trunk. Three years from the onset of the inflammation, the thigh was found fixed in the position of extension and immovable at the hip-joint; chloroform was given, the hip-joint flexed and the joint was immediately free, passive motions, especially flexion and abduction, were continued for *several months*.

This case is an instance of the substituting of one evil for another but a lesser one. It is my opinion, that the femur

neck was fractured and non-union induced. The number of months, which elapsed before the patient was able to resume his walking is not given. If the reporter had given us definitively the duration of the treatment, we might have proved what must otherwise be only a surmise. The report of this case, imperfect as it is, illustrates the usual course which fractures, of the neck of the femur take, when undergoing a cure by the natural method.

The case No. XVIII, is so reported as to defy analysis. From the report the patient may have been under manipulative treatment either ten months or some period short of twenty-two years, and we all know that much improvement of defective parts can be brought about in so long a period as twenty-two years. Some of the older practitioners of our art will no doubt be able to recollect meeting with dislocated elbow-joints, which not being reduced at the time of displacement, must have been a long time, if not locked, yet with very limited motion, which, however, after the lapse of much time had by the use of the arm, gained almost complete mobility.

Case XIX, does not refer to the question that here interests us, being one of extra-articular abscesses. "In this instance, there was no disease of the bony structures, and there never had been suppuration within the joint."

Case XX, is another very unsatisfactory report. Partial ankylosis of the knee, accidentally ruptured, and examined on the following day, "I found that almost the entire motion

of the joint could be borne." Just what might have been expected to be was found the day after the application of force to a deformed limb. But what the condition of the patient was one month after is not reported. My personal experience has invariably been, that the part released relapsed into the condition in which it had been directly before the accident.

Case XXI.—When fourteen years of age, suffered from hip-joint inflammation, which continued 18 months and then improved; when again during the subsequent 18 months there was some return of the disease. In the fourth year of disablement he was specially examined, when the joint was found flexed with slight motion. The treatment consisted of gradual extension which was continued for three months and a half, ere the limb was brought in line with the trunk and afterwards passive motion and friction were employed, and rather overdone, and "in consequence an abscess was formed." When last seen he had considerable power over the limb with motion at the hip-joint.

Three months and a half were expended in reducing a deformity not attended with healthy ankylosis—true ankylosis. This fact does not recommend the method of the reduction of deformity by pure extension. The reporter admits the failure of passive motion in this case, because it was overdone, and, by his reticence regarding the motion at the articulation, causes the reader to suspect that no increase of motion was gained by the treatment pursued.

Case XXII, is a very satisfactory case, in which deformity was corrected. We are informed, that before the attempt at alteration of the joint, there was some motion of the joint perceptible, and that the deformity was reduced by extension, after which passive motion was practised; but the information

which would have been useful is not reported, that is, whether the motion after the alteration of form was greater or less than before, an omission which renders the case of little interest to us.

Case XXIII, is another instance of alteration of the form of the limb from a useless to a useful form, but like Case xxii. supplies us with no information on the question I have here debated.

Case XXIV, is one of ankylosis of the lower jaw, treated by repeated forcible separation of the jaws. It failed for the obvious reason, that the maxillary joint or joints were not healthy, a matter that seems to have never been considered by the operator, who reports no examination to detect whether their condition be sound or unsound, but treated them as a mere piece of inorganic mechanism, that had become jammed and required to be "ground" loose again.

Case XXV.—When twenty-three years of age, suffered from rheumatic inflamed knee-joint, and after seven years treatment the knee was contracted at an angle beyond a right angle, patella attached to femur, hamstrings tense, very slight motion at the articulation, and pain, "even when the limb was at rest." It had been proposed to relieve by amputation, extension having failed to relieve or correct the deformity. At a consultation of surgeons it was decided to divide the hamstrings, then use gradual extension, which failing, the adhesions should be ruptured. The hamstrings were severed, and in six days gradual extension was commenced. Extension was continued several weeks, from the 25th of Nov. to Feb. 22nd, when the adhesions were ruptured by flexion and the patella separated from the condyle by the use of a perforator. "The limb was placed in a *somewhat more extended* position than before, and was, as rapidly as possible, fully extended. He was well satisfied to have gained a useful limb.

The concluding portion of the report of this case, "He was well satisfied to have gained a useful limb," leaves the reader no alternative but to suppose that, when the treatment was ended, there remained no trace of motion at the articulation, as the reporter never fails to omit any gain that may be supposed to follow his manipulations. This case is really only an example of the alteration of form of an unsound limb, a matter very easy of performance, as the difficult cases are always the sound ones. It would be unfair to suppose that the treatment of this case is typical of the methods pursued by the surgeons of our day. The principles and mechanics of the reporter's practice in the reduction of deformity must be imperfect or astray, otherwise how could an unsound articulation have taken so long as nearly thirteen weeks, before the angle of deformity was obliterated. One-third of this time would have been ample, without any severance of tendon or perforation of the joint.

Below I append a case which is evidence in favour of my comments on the foregoing case.

Ten years ago, I became acquainted with a retired wine merchant, resident in the suburbs of this city who, having suffered from disease of the knee-joint in youth, was unable after cure to extend the knee beyond a right angle. This condition had existed thirty-five years, and, besides this defect, the foot was limited in its movement at the ankle, so that it could not be flexed, but there was very perceptible motion at both knee and ankle. The defect noticed in connection with the ankle was obviously not the result of disease, but probably the result of the patient's efforts to fix the foot and so hinder its jarring the inflamed knee, during the unsound condition which had been allowed to run a course of spontaneous cure. I often importuned him to permit me to improve the limb, but he would give no

heed to my request. In August, 1880, I was requested to visit my acquaintance. On my arrival I found him suffering from much pain in the knee-joint, which was explained to me as being the result of a fall, while the gentleman was in the act of stepping on to the platform of a tram-car. Under the circumstances in which I found him, my advice was, that the limb should now be made a useful one. The patient at first declined, but ultimately accepted my proposal, conditionally, that the necessary appliance should be fixed while he was under the action of æther. A retentive extension was applied to the limb, and in three weeks the angle of deformity was gone, and after eight weeks fixation the parts were again painless and sound. It was now proposed to rectify the useless condition of the foot, which he consented to only after great persuasion; the tendon achilles was divided and the foot immediately placed square to the leg, and the patient was able to move about his bed-room in the twelfth week. The machine supporting the leg was continued for twelve months, and, when removed, there was perfect motion at the ankle-joint, while at the knee-joint there still remained the same range of motion as it was possessed of before the accident.

The result that followed surgical interference in this case may, on account of the long period that the deformity had existed, appear to an unprofessional reader, marvellous; but the injury, and the fact that the sufferer, dreading to call surgical aid, remained in a state of inebriation a week in bed, so well prepared the part for the natural method of reducing deformity, that it had become a very easy matter to succeed—not more difficult than if it had been thirty-five months instead of that number of years.

To further show the advantages, both as regards economy of time and the success that can be achieved by methodically attempting the reduction of deformity, I will relate another instance out of many that could be reported.

In the early part of 1881, a friend of mine, an ironfounder, requested

me to call at his stables to inspect a horse which had fallen and much injured his knees. After inspection of the horse, I noticed with us, in the stable, a youth aged twenty-one years, progressing about with the aid of crutches, and, on making enquiries as to the nature of his defect, was told that he was clerk to my friend and had been crippled in both legs since he was three months old. I suggested that, we might examine the clerk, to which proposition the clerk assented. I found him suffering from extreme talpes valgus in both feet, with partial paralysis of both flexors and extensors of one leg, in conjunction with genu valgum of the same extremity. I proposed that he should enter my hospital and submit to the correction of these defects, to enable him better to progress without crutches. On consultation with his parents, they advised him not to submit to treatment, which advice he, however, disregarded and became an inmate of my hospital. The three deformities were corrected in nine weeks, in the tenth week he could progress with one crutch and a stick, and in the fifteenth week he could progress with two sticks. At the termination of six months he could walk many miles daily without either crutch or stick, but he had not thrown away all appliances of a curative nature and will not probably do so for another two years—in all about four years.

This case, from the shortness of time required to amend the shape of the extremities, favourably recommends to surgeons, a practice which has been here advocated, inasmuch as it applies to all manner and conditions of deformity that may require amelioration.

Case XXV is the last reported, illustrating “the treatment for the removal of deformity and the restoration of mobility in various joints.”

To me the cases have been instructive, and their perusal, as fully reported* by the author, must well repay the reader. On this question they are the best records of personal experience known to me, even if the defects of record, here com-

* Here they have been condensed, and restricted to clinical data only.

plained of, were admitted. The author informs his readers, that his experience extends over "more than one thousand operations of this description." If we accept this statement, and there is no reason why we should not, it may be fairly supposed that, "from more than one thousand," he has culled twenty-five of the most salient examples of what manipulations can effect. A careful study of them has only convinced me that they show, that an artificial imitation of the process, which nature follows when striving to restore health and function to a diseased articulation, ought to supersede the senseless, main-force treatment, vaunted by the majority of surgeons of late years, and which is a departure from the path along which our predecessors were advancing their art.

The next evidence relating to manipulations, bone-setting, and forcible movements of diseased articulations, worthy of notice, is one which has been given to us in a large encyclopædia of the art of surgery.* In one of the volumes of this encyclopædia,† a well known "States" surgeon, one who has given much attention to the subject here considered, after informing his readers of the prevailing opinions in regard to bone-setting in this country, gives a summary of his own conclusions in the following :—

1. Joints which for various reasons have been kept immovable for several weeks or months, become more or less fixed in position from the

* The International Encyclopædia of Surgery.—Macmillan & Co., London, 1883.

† Vol. iii, page 713. 1st Edition.

contraction of muscles and ligaments, which, having never for a long time been put on the stretch, adjust their nutrition to their shortened form.

2. When injuries have occurred in the vicinity, certain parts may become adherent, such as tendons to their sheaths, or planes of ligamentous fibres to other planes, above or beneath them, on which they ought to slide freely.

3. Nerve twigs running between movable parts may become adherent from plastic effusion, so as to be dragged upon every time movements take place.

4. In a few cases, slight partial adhesions of synovial surfaces occur, which, being ruptured, liberate the joint from its bonds. A vigorous twist, with full flexion and extension, stretches contracting parts, and often ruptures normal adhesions, thus curing their patient; and it makes no difference whether this is done by the manipulation of a bone-setter, or by an accidental fall or wrench. For instance, a gentleman in Chicago, who had his knee badly stiffened, as the sequel of an accident, was limping along in unusual haste one day, when he fell and doubled his knee forcibly under him. The result was an immediate and complete cure of his lameness.

In case of mere contraction of muscles and ligaments, the cure can usually be obtained by gradual increase of movement; but if nerve-twigs are adherent, or if the patient is hysterical or very nervous, the pain attending each effort frightens the sufferer, and the plan of gradual extension cannot be carried out. These are cases for the bright triumphs of the bone-setter, who gets hold simultaneously of the imagination and the limb, and heroically ruptures the adhesions.

“The whole theory, as far as it contains valuable elements, may be summed up in the following principles:—

“1. The points of adhesion in painful cases will be found at the spots which are tender when pressed upon, and when the part is put on the stretch.

“2. The points of resistance in cases of painless stiffness are found by moving the part in different directions.

“3. These points are to be ruptured by quick, strong motions, and freedom thus gained must be preserved by daily exercise.

“It is evident that many cases of lameness may be properly treated by this method, but it is also true that most of them can be better, but more slowly, cured by systematic exercise. The two class of cases which require the rupturing plan are :—1. Those in which there are adhesions so formed that nothing else will liberate them. 2. Those in which the patient cannot remain under the surgeon's care long enough for the employment of the gentle, gradual plan.”

In support of the preceding rules, the writer supplies us with no proof, except the anecdote about the limping patient. Indeed, it is evident that his deductions have been taken from writers on the subject in this country. The writer's idea of the qualifications, which usually go to form “a natural bone-setter,” is that the practitioner should possess “a lying habit of declaring every stiff or painful limb to be ‘out of joint’.” But it is my belief that, in the case of every one of them, that, which is attributed to a “lying habit,” is really ignorance, and that, to the person in search of health, the latter defect is the more injurious of the two.

Some of my readers may think that the space, occupied by criticism of the use of manipulations in the treatment of articular disease, is more than the subject deserves. But inasmuch as our text books of surgery—used by the students of to-day, the surgeons of the future—are all infected with the erroneous teachings which I have here tried to controvert, and, as its acceptance or rejection must seriously affect our practice, either for better or worse, it is imperative that the question should have been fully debated.

Until the principles and the proper method of the treatment of articular disease have been demonstrated, most unsuccessful cases will generally be placed to the credit of wrong treatment. It is so with all ailments, the treatment of which is mere empiricism. The fact is often forgotten, that many of the cases of joint disease are only local manifestations of a constitutional flaw, which, even though the articular lesion be cured, will finally defeat both our surgery and medicine by its recurrence in parts essential to life.

There are two modes of relief from the incubus of a diseased joint which I have not referred to, which, although not to be classed as treatment, must sometimes be resorted to when the case is suspected to be incurable, namely, amputation and excision.

Up to the middle of this century, amputation was a very common method of removing the obstruction, to the continuation of the patient's health, caused by disease of an articulation of an intractable character. In anticipation of evils, the practitioners of those days, judging that most joints chronically affected would ultimately become a severe, if not a fatal, test to the patient's constitution, performed amputation in cases of joint-disease, now otherwise amenable to successful treatment. In latter years, the rule of amputating, in either certain or doubtful cases, became superseded by a better one, the rule of excision, — and here again, this step in the direction of conservatism not having

been preceded by any improvement in our treatment of articular disease, surgeons performed excision in anticipation of evils, and upon joints certainly amenable to successful treatment. Excision was very successful, so far as not being attended with a high mortality, and the limb after excision was as superior to an artificial limb, as a limb cured in useful form, though with a defective joint, is superior to a limb from which a joint has been excised.*

The success of amputation was dependent upon the age of the sufferer ; so with excision, the younger the patient the less the mortality, though the ultimate shortening when adult life

* During last year, 1883, I was invited to visit a young man staying in this city at the Adelphi Hotel. On my arrival there, I was informed that my services were required to inspect an excised hip-joint, and, if possible, suggest a suitable mechanical aid, such as would be a supplemental power to the right lower extremity, which had remained feeble after the operation. I made an examination of the hip and limb and found that the excision had been a success, so far that there were no remains of diseased action. The operation had been performed by a well-known "States" advocate of both excision and of the practice of early passive motion after excising; but though the operation had the appearance of success, practically it was a failure, as the lower limb was attached to the pelvis by a perfect flail hinge, so much so that the muscles between the thigh and trunk could not exercise their power. To minimise this defect the patient was wearing one of the various forms of "portative appliances" much used by surgeons in the United States. The appliance, however, was utterly unequal to the strain which it was continually subjected to. After my examination of the right hip-joint, my attention was directed to the left elbow-joint, which I found in a tender state from chronic rheumatic arthritis. After an inspection of this joint the left knee was shown to me; this joint was found to be suffering from the same ailment as the elbow. The patient's age was 17 years. My examination and his clinical history showed that his left hip had been excised while suffering from chronic rheumatic inflammation. The reasons which induced the surgeon to excise the right hip, equally applied to the left elbow and knee. This case was an example of successful excision, but of a useless limb—less useful than if it had been allowed to run a course of natural resolution and its attendant deformity. It was the first case which I had seen of excision of the hip-joint without any trace of the original ailment; and, further, it was an example of excision in anticipation of evils.

was reached is greater. The same rule applies to the treatment of articular disease, when the conservatism of the joint is desired, the younger the sufferer the more certain he is to recover. To make a favourable prognosis, it is of more importance to find the patient few in years than to find the disease moderate in extent. My own experience informs me, that the mortality from articular disease, is greatest in subjects whose ages vary from fifteen to thirty years. Patients who suffer after this period, generally require a much shorter period of treatment and confirmation of cure, than even subjects whose ages may vary from one to fifteen years, there being for the former at least one half less time required. For instance—In the early period of life, three years is an average duration of surgical supervision, whereas in the latter part of life two years is very seldom demanded to complete the cure, and there is scarcely any tendency to the suppurative condition. This is explicable by the supposition, that ere the decline of life is arrived at, a process of “natural selection” has eliminated from the crowd, those with constitutional defect or low vital energy. Excision is rapidly becoming as infrequent as it became frequent;* for this, there are two causes, improved treatment on the part of the surgeon and some amount of surgical knowledge pervading

* It is somewhat remarkable, the joint generally thought to best demonstrate the value of excision, the elbow-joint, is also the most amenable to rational treatment.

the educated portion of the public who, knowing what treatment with time can do and possessing the means to have treatment, elect to wait, and naturally decline to be mutilated. This is shown by the fact, that most of our excision cases are culled from those who become inmates of our charities, and are patients with no knowledge of the healing art, with which they might debate their condition with the surgeon; and to these patients time is a consideration; and further, very chronic disease is never, and properly so, a very welcome visitor on entering an hospital.

Statistics of excisions, many of them being performed as a matter of policy, are not reliable data from which to draw conclusions.

My own conviction is this, that some of those cases of articular disease, which treatment cannot cure, and which terminate fatally in most instances, might have been saved by amputation; or by excision, but then in order to have a chance of success the operation must be performed early, and to do so is only to return to the practice of twenty years ago and excise all round, mutilating all to save the few. Time tries all things. That amputation at times and excision at other times will have to be resorted to, is probable, but the most successful result from excision is only equal to the most defective but sound useful limb that has been subject to modern treatment. It is too often taken for granted, that, once a joint would have

been excised, the drain of pus by multiple sinuses, so frequently concomitant of severe joint diseases, is sure to be arrested. But this expectation in most instances is not realized. Statistics hitherto given us relate to mortality rather than to the exact condition of the part after the removal of the joint. I have frequently seen, in private practice and after dismissal from public hospitals, cases which had been operated upon years before, yet, the condition of the junction resulting after operation was in no way different from what we see when the joint is undergoing spontaneous cure by suppuration. Such cases, while not favourable to excision yet not terminating fatally after operation, would go to swell the statistics showing a low rate of mortality, though, after the mutilation of excising, there had been no benefit secured thereby; and some of these cases, as I know, have ultimately died, although they had been operated on at an early period of the disease.

Even now surgical opinion is undergoing a change in the direction of my own teaching, which proves that my forecast of the place excision is to occupy in the surgery of articular disease was correct, and not far from becoming generally accepted.*

In concluding, I will ask the reader, when considering my opinions, to take into account the meaning I attach to

* I first published these opinions in my volume on Diseases of Hip, Knee and Ankle Joints, July, 1875, pages 48-9, and again in 1876, pages 72 and 259.

certain terms which are here recapitulated.—False ankylosis, when used by me, refers to unsound joints, media, and altered muscles; sound ankylosis refers to sound joints and media, whether fibrous or muscular; and the condition here termed stiffness, always relates to a temporary but sound condition, which for a time may appear permanent yet pass away, this state of the part being only possible of demonstration after trial by use. By retentive extension is meant, an extension which may not constantly be acting, such as the weight and pulley, or india-rubber accumulator. By fixed reclination is meant, that the patient is retained without interruption in the horizontal position, fixed to a like rigid plane, so that the affected joint is never varied, except towards the line of final rest, which it is to occupy during treatment, for the induction of the resolution of the disease.

The reader will have noticed that most of the arguments advanced in this volume, are grounded upon certain very obvious deformities attendant upon the disease of special joints. This restriction I have purposely adhered to, as the deformities here discussed are generally admitted to happen. I have reserved the discussion of those deformities attendant on the disease of the other articulations, and which are difficult of demonstration, for the succeeding volume, which will be devoted to the practical application of the principles of treating articular disease in general.

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Part VI.

June 1886.

CONTRIBUTIONS
TO
SURGERY AND MEDICINE.

THE PRINCIPLES
OF THE
TREATMENT OF FRACTURES
AND DISLOCATIONS,
BY
HUGH OWEN THOMAS.



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[Part VI.]

CHAPTER I.

THE PRINCIPLES OF THE TREATMENT OF FRACTURES AND DISLOCATIONS.

During the last thirty years much progress has been made in surgery, by the introduction of changes of great importance, notably the discovery of anæsthetics and the method of exactly employing antiseptics. These additions to our art have mainly been the result of much labour and thought, and the success attendant upon their employment has developed a general spirit of innovation, so that several modifications of past practice have been made and too readily accepted as improvements, often because they were novelties, but, neither being the result of sufficient thought, nor having been well tested by their projectors, some have been, and others are destined to be finally, set aside. Some of the latter I hope to point out in the following pages.

The history of the growth of surgery disproves the existence of innate or inspired ideas ; surgery, like other experimental sciences, has had to be cultivated, and it was only after the expenditure of much toil and thought, during which sur-

roundings have sometimes advantageously and at other times adversely influenced it, that individuals have successively advanced it to its present usefulness.

When commencing as a general practitioner of surgery and medicine, I was indoctrinated with several theories; some of which clinical experience has compelled me to abandon, among them being the belief that the permanent loss of motion, which sometimes remains after recovery from articular disease, is due to the immobility more or less employed during the treatment of this ailment. This change of opinion, as to the cause of articular ankylosis, forced me to inquire how it was that fixation of a fracture assisted its ankylosis; the conclusion I arrived at was, that while efficient fixation of a diseased joint tended to its earliest restoration to a normal condition and action, fixation did no more for a fractured bone.*

The fixation of fractures merely favours their early and normal repair, and tends to discourage the formation of supplementary matter; in fact, fixation in both cases tends to the same result. Conversely inefficient fixation tends to delay repair and to develop a condition and product, not previously present, known in a diseased joint as deformity, and adventitious matter around or within, and in fracture as deformity and adventitious matter, termed "ensheathing callus," around the

* It was from observations made during the treatment of diseased joints that I gained a better knowledge of the principles and the methods of treating fractures.

fracture. Both of these are to be avoided, for symmetry is lost, and the callus is superfluous, which, if the fracture involves a joint such as the elbow, knee, or jaw, might cause defect of action to remain, so that in these cases it is very important to have the bones repaired and restored neither stronger nor weaker than they were originally.

In the treatment of an inflamed joint efficient fixation is the most important factor that can be employed to conserve the synovial membrane — a saving which precludes the possibility of permanent ankylosis remaining on recovery. It is also the best means, when the synovial sac has been damaged, of conserving the articular cartilage, and if this has been destroyed, it is the best means of permitting the bones denuded of cartilage to become early and truly connected, and securing for the sufferer and joint the best chance of recovery. So with fractures, efficient fixation best assists the restoration and repair of the part fractured.

While cultivating this field of enquiry another question presented itself to my mind—How does it happen that, while trivial injuries to joints often lead to rather intractable articular inflammation, simple fractures seldom lead to disease of the bone? The explanation is this, that joints slightly injured are very tolerant of being used for some time after, even though retrogressing; while fractures from their nature, are, from the moment of the accident, generally attended by pain, commensurate with the damage done, so that use is not tolerable. If it were otherwise, motion and pressure would soon

lead to degeneration of the parts fractured. For simple fractures would be as frequently neglected, and they would also be found to be as intractable to treatment, as examples of the articular inflammation, commonly termed chronic. This is so obvious that it would not further convince if clinical examples of such occurrences were introduced here. Perfect rest of a fracture, if it could be maintained without supplemental art and interference, would best permit its restoration and repair* of fractures up to a normal condition. By the intervention of art, according to the means employed, repair may be either delayed or urged on. The means that may cause delayed repair are too much elevation and compression of the limb, and deficient immobility; compression and elevation being very often necessary evils to enable the surgeon to gain the nearest approach to the original symmetry.

Again, the repair may be easily urged on, by permitting the limb to resume the perpendicular position and so favouring tumefaction, or by the use of interrupted compression, that is, "damming" the circulation of the limb by circular compression above and below the fracture, thus relieving the fracture from compression within a small area circumscribing it. This release of the fracture would not materially sacrifice the surgeon's control of the part. Should this plan not sufficiently stimulate the part to more active repair, then it may be supple-

* By "restoration" I refer to the gaining of the original symmetry. By "repair" I refer to bony union.

mented by the employment of "percussion," or percussion alone may be tried.* These methods of urging the consolidation of callus must not be pushed too far, otherwise they may induce delay of recovery from prolonged unsoundness of the part, of which we sometimes meet examples in fractures, where although consolidation feels to the surgeon to have advanced to firmness, yet the sufferer expresses his inability to use the limb from either pain or a feeling of weakness at the point of repair. If union is long delayed this method of urging on repair may have to be practiced to gain usefulness, though at the loss of some symmetry. The principles, which should guide our practice in curing articular lesions, are identical with those applicable to the management of fractured bones. Spontaneous recovery from even serious bone fractures and with excellent restoration, most surgeons must have observed, but as a general rule it may be stated that such repair is afterwards hampered by an avoidable degree of deformity, which may also be observed after spontaneous resolution from articular disease. The popular opinions about the primary manipulations of fractures by the surgeon—"setting the fracture"—point out his real value to his confidants, that he is above all the restorer of symmetry; nature, if not thwarted, performing the remainder.

The restoration of symmetry, after the fracture of a bone, is usually attempted at the first opportunity, generally within an

* Liverpool and Manchester Medical and Surgical Reports, 1876.

hour or two after fracture and before swelling has made the style of the fracture obscure to the surgeon. The restoration, if the bone be not jagged, may at the first visit be successful ; if not, then there remains for the surgeon the continuous use of counter-pressure, to reduce, during the after treatment, the defect of symmetry as much as possible. A deformity that cannot be made right during the first day may be corrected during the following three weeks.

If the surgeon is called to treat the fracture after the accession of much swelling, then by elevation of the limb and other treatment, he must get the fractured part freed from swelling, so as to be able to see and feel the nature of the displacement, when the continuous method of restoration can be tried. If a fracture is in proximity to a joint, the limb ought to be so fixed that the utmost prospective usefulness may be afterwards gained, should the joint have also suffered an injury indirectly.

This rule ought to be rigidly followed, whether the surgeon be called early or late to treat the case. If the surgeon when called to a case, cannot decide whether it be one of fracture through a joint or a dislocation, he should so pose the joint that it assumes the appearance of reduction.

Set theories have greatly influenced the treatment of fractured bones, and these several theories have been each embodied in the mechanical appliances which have been employed. The practitioner, according to the principles ingrained in him, has devised such mechanical aid, as he thought would

influence for the better that which he judged to be the main impediment to either repair or restoration, or both.

For example, some surgeons have devised their appliances so that they might minimise the uneven muscular action observed in fractures ; doing this, by placing the injured limb in special positions, as in the treatment of fracture of the femur shaft. The hip and knee are fixed in a state of flexion, by the use of inclined planes, to neutralise what were judged to be the main opponents to restoration. Other surgeons aimed at overpowering the irritability of the muscles, influencing the symmetry of the fracture, by “extension” and “counter-extension,” of which we have examples in the “weight and pulley,” the use of “rubber accumulators ;” or by an unyielding power acting adversely from fixed points ; or by the use of the adhesive gaiter and perineal band or crutch. A third class of practitioners have judged that mere mechanical immobility was the most important object to be secured, and have consequently employed mechanical methods, reflecting their special ideas of treatment. This is seen by the materials used by these surgeons. The injured limb, at the earliest possible time, is “built in,” with materials placed on to the injured limb, keeping to its lines at the time of application. In ancient times surgeons performed this by using eggs, flour, and cloth ; but in latter days plaster-paris, shellac, felt, and silicates are used, and the surgeons who use these lean towards the practice of infrequent inspection, a convenient method requiring much labour at first and little

care after, and leaving very little opportunity for the display of skill.

A fourth class of surgeons attach primary importance to a diagnosis of the manner of fracture, and to the use of supplementary means continuously influencing the fracture until repair has been completed. For instance, knowing the manner of the fracture, they "set" the limb at the first inspection, perfectly restored if possible, but if this be not practicable, they continue to influence the defect so as to reduce it as much as possible before the period of consolidation; consequently the mechanical means and mode of application which they would use depend upon the manner of the fracture, whether it be one of the four obliques or a square one. And the treatment would be mainly directed towards opposing the tendency to deformity. The theoretical views of this class of surgeons, to be practically applied to the treatment of fractured bones, necessitate the use of means for forcibly controlling muscular action, and the use of rigid planes not symmetric with the shape of a normal limb, which may have to be padded contrary to the defect of symmetry. This method of practice involves frequent interference and careful thought, and gives an opportunity for the exercise of personal skill, and enables repair to go on least impeded and the best attainable restoration to be achieved. To this procedure, partly mechanical to gain restoration and partly physiological to urge on repair, I have always leaned, believing that thus

the highest average of excellent cures can be gained.* It is my belief that hitherto a too mechanical view of treatment has prevailed, sufficient recognition not being made of the fact that it is living matter we have to influence. Moreover, since the discovery of the antiseptic method, this omission has become much more general, so that in these days, it is not uncommon for even a recent fracture, especially if compound, to be at once drilled and wired or pegged, as supplementary treatment, where ordinary mechanical appliances intelligently used would be better. This practice I hold to be a retrogression in the surgery of fractured bones; indeed, if we are more thoughtful of the fact that it is living matter that we have to manage, then it would seem that even in delayed union of fractures, actual interference, such as drilling and excising, will seldom be required; nay, it will be found that such operations are, in some cases, an hindrance rather than aid to repair, and operations of this character would then be reserved for old chronic cartilaginous connections only. As evidence that the foregoing remarks are not without justification, I can refer my readers to a report of a

* I believe C. Aston Key, in the year 1842, was the first surgeon to publish and point out the important influence the manner or direction of the fracture had in producing deformity attendant upon fractures, and its relation to treatment. Of late years, Professor Gordon, of Belfast, has revived this teaching. Mr. Key's opinions were given in a letter, which is published in Costello's *Cyclopedia of Surgery*, vol. ii. page 378, in an article on fracture, by Messrs. T. MacDonnell and T. W. King, an article in which I think theory and practice are more consistently taught than in any publication which has subsequently appeared.

thoroughly representative meeting,* at which the principles and the practice of the treatment of fractures of the patella were discussed. At that meeting none of the speakers alluded to the possibility of physiologically aiding the repair of fracture of this bone. All admitted the existence of a difficulty; but those who did suggest a solution of the impediment, only suggested the addition of an operation by knife and drill, direct mechanical interference with the bone, as a supplement to the treatment previously in use. I contend that to be ignorant of the manner of efficiently using means for treating fractures of either the patella or the neck of femur, is to be ignorant of the first principles pertaining to fractures in general. Of all fractures, those of the patella, olecranon, or neck of femur are most easily repaired, and require the least mechanical skill in their management. The surgeon has only to avoid interfering with the natural tendency to repair, and so fix the injury that unintentionally the patient does not interfere with the progress of repair.

It is forty-six years since any great advance has been made in the mechanical treatment of fractures.† Up to that time our predecessors had much difficulty in avoiding defects of symmetry after fractures; but of late years mechanical appliances have been so much more suitably constructed, that errors of symmetry are more easily avoided, yet withal, the mishap of delayed or non-union has been more frequent, which, in my

* *Lancet*, Nov. 10th, 1883. At the Medical Society of London and at several other societies in the same year, discussions took place.

† At Liverpool, on July 24th, 1839, in an address on surgery to the members of the British Medical Association, Mr. J. H. James, of Exeter, introduced to the notice of

opinion, is in many instances due to the extra attention and efficiency of the mode of restoring the symmetry of the limb. Another cause of delayed consolidation of the fracture, which has not been sufficiently noticed, is that caused by an unhealthy condition of the medium of repair. So that cases are further delayed from use after consolidation by the continued unsoundness of the connection, hindering the patient from using the limb, though it be palpably strong; there remaining a feeling of either weakness or pain, according to the degree of unsoundness of the repaired spot, reminding us of the delay of use that often results after the reduction of dislocation.

Of all the evils liable to mar the result of our treatment of fractures, I think that of delayed union is the worst, for should it become permanent, prospective utility becomes very problematical. Many remedies and methods have been proposed towards correcting the evil of delayed or non-union. There

surgeons new details of treatment appropriate to the restoration of fractures. This was the first important and really valuable addition to the appliances used in treating fractures and diseased joints. Mr. James's method possessed several points of merit—improved method of extending and counter-extending a limb, diminished friction of limb on its line of support, and less compression of the part injured. I think that to Mr. James is really due the credit of giving an impetus to the series of lesser improvements which has since been added to our practice.

There appears one special topic about which American surgeons are unanimous, it is, that to one of their countrymen is due the credit of having introduced to our profession the uninterrupted method of extension. Among them I notice with astonishment that Professor Hamilton, who should be well informed in the history of extension, wrote to the *Philadelphia Times*, Nov. 24th, 1877, ascribing the invention to a United States surgeon. The credit of the invention is due to the late J. H. James, of Exeter, who described the details far more completely than did Messrs. Josse, Crosby, Buck, Davis, or any of his followers. [See his address on surgery, delivered in Liverpool, July 24th, 1839.] At the time that Mr. James published details of his treatment of fractures of the thigh by continuous extension, so great

are two methods which we may employ for the purpose, either to stimulate the part or to interfere with the fracture through an incision ; the latter, since the introduction of the antiseptic method, being early and too frequently resorted to.

There prevails just now a tendency to cut many of our surgical "knots" and to decry efforts at untying them. We have been so pleased with our new and valuable acquisitions that, for a time, a search for nature's secrets has been suspended. That my complaint is just, this quotation will show :—

"Hunter's views that surgical operations were often a 'tacit' admission of our inability otherwise to accomplish a cure, and that they should always be approached with 'a sacred dread and reluctance,' would assuredly be qualified now, when in so many new and bold operations so great a measure of success is obtained, and that without the suffering

an authority as the late Professor Syme, asserted that Hildanus had also practised the method ; this, however, is not the fact. Those who consult John Bell's famous volume on Historical Surgery can there see figured "The Jack Stone of Hildanus." John Bell surmised that certain illustrations in Hildanus' work represented a strap and buckle, two hooks, and a rope, to which was attached as, he thought, a stone. In reality, this supposed stone is only a ingenious method invented by Hildanus to cover the pulley blocks of his apparatus, which he only used for the purpose of reducing dislocations and fractures. His illustration certainly looks very like a stone. There is nothing in the text to warrant John Bell's description of the "Jack Stone," which indeed is but an invention of the great historian. The mistake can be accounted for only by supposing that Bell simply gazed at the illustrations and never read the explanatory text. A method of retention was well known to surgeons at a very early date, which must have been difficult to bear and far from satisfactory in its results, for at page 132, book ii, chap. viii, paragraph 8, Heister's surgery, 1745, we are informed that "If we had an instrument that would keep the fractured thigh properly extended, and of the same length with the sound one, for about fourteen days, or till the case was perfect, we could go on with more certainty and success." J. H. James's method of continuous extension was original, and I do not believe that he had any suggestion from the published opinions of his predecessors.

Hunter had to witness, destitute as he was of the welcome aid of anæsthetics.”*

The following quotation will also show where and how Mr. John Hunter left scientific surgery :—

“It has often been held as a matter of reproach, in regard to John Hunter’s philosophy, that he too palpably personified Nature, looked always for ‘final causes,’ and attributed to the living organising principle, or ‘principle of life,’ or even to parts of the body in which it acts, a consciousness of its own actions and intentions. The instances in which Hunter does this are very numerous ; but when duly considered, his language on these occasions must be regarded as largely figurative, and springing from a craving and a struggle to divine the motives of Nature ; and at all events, they should not be taken as meant for explanations of the vital processes concerned. If, indeed, we consider the most direct evidences of his adhesion to the then prevalent doctrine of ‘final causes,’ we discover proof that his thoughts were only partly entangled in the teleological net, and that his mind struck out freely to investigate the modes of action by which the end or final cause was to be obtained.”*

If we are now to think less of Hunter’s “tacit admission,” will it not hinder progress in surgery? We cannot have come to the end of our tether by the discovery of the exact method of using antiseptics. Indeed, since the introduction of them into surgery some operations have become more rarely resorted to, not so much from their discovery as from our having of late years better understood the natural mode of repair. Their introduction into surgery has certainly increased the tendency to interfere, by knife, saw, or drill, with fractured bones, whilst physiological treatment has been rather neglected. In the following pages it is intended to show that much more, than has

* From the Hunterian oration by W. J. Marshall, reported in the *Lancet*, February 21st, 1885.

hitherto been thought possible, can be done towards the repair of fractures and the correction of dislocations, without immediate interference with the bones. Much can be done in the direction of supplementing and imitating the natural reparative process, and at times we can thus succeed when a knife and saw have failed. At the same time it must be admitted that direct interference, so far as I know, cannot as yet be utterly set aside in the treatment of fractures.

The same principles of treatment apply to dislocated joints as apply to joints diseased, deformed, or to bones fractured.

If we analyse the causes of the symptoms of fractures, we shall find that they can be traced to the same influence which induce the symptoms demonstrative of articular lesion. For instance, the first cause of deformity in fractures is its manner; the second cause, muscular action, "the effort of the patient, by the exercise of his will," to steady the limb and fix the fracture, and local or reflex nerve intelligence having also some influence; and we have a fourth cause, superfluous callus. In diseased articulations, the direction of the facets of articulation is the first cause which influences the direction of the deformity; the second cause is muscular action, and there is a third, the local or reflex nerve intelligence; the fourth cause is superfluous matter around the joint. Again, if we consider the symptoms in connection with displacements of joints, after or before reduction, they are in character and cause similar to those following fractures or diseased joints. Further, if we compare the treatment of fractures with that of articular

lesion, we find that, during the treatment of the latter defect, modern surgeons are now inclined to avoid compression of the locality diseased, and to select normal parts as points for fixation, which, strictly speaking, ought to be the rule in treating fractures. We also find that there are signs of resorting more and more to fixed extension rather than to continued extension during the treatment of articular diseases, and it may be predicted that in the surgery of the future the highest value will be placed upon this detail of treatment for restoring and repairing fractures. The essence of treatment will be rest, controlling the fractured bones by gripping the sound parts, combined with a fixed, rather than continuous, extension.

If the surgeon is called early to treat a case and diagnose dislocation, of course an attempt at replacement ought to be then made. But should it be impossible to make an exact diagnosis at once, the diagnosis being necessarily postponed for several weeks, during which time the displaced part has become well set in the abnormal position, even then, if the principles applicable to the correction of the deformities attendant upon articular diseases, and the continuous restoration of the symmetry of fractures be followed, one or several attempts at restoration may be crowned with success. If the first attempt be not successful, the chance of reduction during a second attempt is more than doubled, provided that too long an interval between the attempts is not allowed. The force of resistance is, on the second or third day after the primary

trial, diminished by at least one-half. If replacement is attempted by this method of repetition, the force employed is not likely to involve much risk in its application, and the surgeon may succeed in instances where no safe amount of force could have sufficed during a single attempt.

It is not uncommon for the practitioner to be called to treat injury to an articulation, when it is highly improbable that he can diagnose the dislocation, as there is intense pain, tumefaction, perhaps compounded by cutaneous injury, which may make the surgeon anxious lest it communicates with the joint, and anxious not to delay protecting the articulation from septic influences, an oversight the ablest living surgeons have (to my knowledge) had to contend with.

In such an instance as the foregoing, to ensure, even if a dislocation remains after an injury, that it shall not materially diminish the subsequent utility of the limb, the surgeon, when uncertain of the exact condition of the parts, or whether certain or not of having replaced a luxation, he should, as a precaution, treat the articulation while unvaryingly maintained in the position of best use, which is generally that which assumes or simulates the appearance of reduction. For instance, in injury to the elbow, it should be maintained flexed at somewhat less than a right angle. When the shoulder joint is injured, the arm and elbow should be fixed as close as possible to the trunk. An injured knee should be held well extended. An ankle and a lower jaw should be fixed well flexed.

Granting that the practitioner in attendance has met with

such a mishap, and follows the foregoing advice, the position indicated should be unvaryingly maintained until the simulated reduction has become well "set." When the patient can bear without discomfort the weight of the part dependent from the injured joint, the surgeon, to gain a useful simulation of reduction of a dislocation, should permit the use of the limb, and carefully note if the patient, after one or two weeks' use, can, by the act of the will only, move the dependent part to and from the angle or the line in which the parts were maintained during treatment; if the patient can do so, let exercise complete the utility of the part; or even if the joint-angle or the line remains stationary, use is permissible*; but if the joint-angle or the line has varied by use, and the patient unaided cannot restore it, then let the surgeon gradually replace, for a while longer, the part injured to the angle or the line of primary treatment. This can always be done by the treatment laid down, as the physiological method of reducing deformities of all kinds. The reader will no doubt recognise that in the rules laid down as permitting the use of a dislocated limb simulatedly reduced, I have only repeated here the rules which infallibly indicate recovery from articular diseases in general.† These are equally trustworthy for the conditions here discussed.

* "If the joint angle or line" remains stationary by use, then we have an instance of that which I have defined as true ankylosis; true, not because it is bony, but because it is sound, and consequently must be permanent. An unhealthy ankylosis will vary no matter whether it be a bony one or not. See Principles of the Treatment of Articular Disease.

† See Part II. The Principles of the Treatment of Joint Diseases, etc.

If the surgeon adopts this method, he can, when he finishes the case, defy ungenerous critics, men that cover their own mistakes by publishing the ill-luck of others. It is never to the interest of either the medical attendant or the patient that it should be known that a dislocation has escaped replacement. When a dislocation has at any time escaped detection, if afterwards a simulated reduction is made, it may give a better result than an actual one would have done, especially if the displacement was long existent.

While admitting that it must always be advisable to use care and all efforts at replacing dislocated joints, it must also be admitted, that no matter how skilfully the displacement may have been corrected, the result may not be so good as in some instances of simulation of reduction; correct replacement, though it may give normal symmetry, is not a warranty that perfect use must follow. The truth of the foregoing remarks, surgeons will endorse, if they recall to mind the many occasions in which, after reduction of a dislocation, defect remained, and was, by the patient and his friends, erroneously attributed to imperfect reduction, partial luxation or displaced sinew.

I hope that the preceding pages supply some information that will ultimately be increased by others and enable us to say that our quality of information in this department is such that personal skill or an extended experience will be much reduced in value. Fractures are injuries, often of such a character, that no matter how much personal skill and mature

experience may have been expended in directing treatment, defect of restoration may remain, the best of treatment having only diminished deformity. Many outside of and in our profession, adopting a too mechanical view of the treatment, imagine that a living limb can be fashioned, as if composed of inorganic matter.

It is always wise that the surgeon should inspect a fracture early, to relieve pain and gain information concerning its style and use it as a guide in selecting the means for restoration during treatment ; but a knowledge of the style of fracture is not always reliable, for, if the fracture be a square one, then it may often happen that the fragment which is the riding one to-day will be the depressed one in a few days after, either from the patient having been very restless, or from the posterior lines of the limb having been much altered by swelling or attenuation, and consequent unevenness of its line of support. Thus, the early information may lead the surgeon astray in the mechanics of his treatment. All appliances, if not liberally packed with soft material, may, during the first twenty-four hours, become tightened by swelling of the limb and thus injure it. Again, a fracture that threatens to become compounded, is benefited by a short delay, so as to allow a moderate amount of swelling to set in, that the skin may escape being punctured by the fracture.

Very violent attempts at perfectly "setting" are seldom advisable, as much can be better done during "after treatment," and, as in many comminuted fractures, it is not

possible to complete the restoration primarily, much harm may be done and nothing gained by such attempts.

In the treatment of joints contiguous to fractures, it may sometimes be advisable not to fix them. For instance, it is seldom advisable to fix the elbow, especially if the fractured humerus be not compounded. In other instances, as, for example, fractures of the neck and upper third of femur, the hip and knee may with advantage be fixed; in fractures of the middle and lower third of femur, the knee only requires immobility.

As a rule, the reductions of both dislocations and fractures are frequently facilitated by commencing to use force in a direction which aggravates the deformity, as thus we may evade much muscular resistance. Neither the feeling of comfort nor of pain, taken singly, is a surety that the limb is progressing towards recovery. The feeling of comfort may arise from the limb doing well; at other times it may be enjoyed at the expense of faulty restoration. Pain may be caused by the defective application of the mechanical aids, or by necessary means used to secure the utmost restoration.

As to the frequency of dressing, which I hold to be a question which the surgeon, attending an actual case, can best decide, no rule can be laid down, for, if a fracture be compound, it may require frequent or infrequent inspection.

In this and a previous contribution are contained my views relative to the essential principles that should guide surgeons

in the treatment of articular diseases, fractures and dislocations and in the reduction of deformities. The key-stone of all treatment directed with the purpose of aiding the return of a diseased or injured part to its normal condition may be included under the term rest. From this principle of treatment there is no justifiable deviation, except for the short periods usually expended by the surgeon in reducing the deformities of fractures or dislocations, or any defect of symmetry, as the surgeon wisely selects a position that leads both to recovery and utmost usefulness, even at the expense of some delay of cure. Rest, as commonly interpreted, does not strictly express the meaning, I would, in a surgical sense, attach to this term, all modes of fixation or enforced immobility of a diseased part cannot be classed under the term. In surgical rest, the fixation or enforced immobility must be attained, by restraints applied to parts healthy, which tolerate them without harm, and, at the same time, control the site of the lesion. Since the principle of absolute rest in the treatment of these lesions has become the creed of the majority of surgeons, who, like myself, have given it unqualified praise, some few dissenters have begun to give us the supposed evils attendant upon rest in the treatment of articular lesions, arguing from an incorrect interpretation of the term rest.

These dissenters, in support of their opinions, draw our attention to two facts, namely, that sometimes joints contiguous to fractures are found partially, and even totally, ankylosed,

at the expiration of the treatment of the fracture, by fixation, of which the joint had unavoidably been obliged to partake. Again, they have brought forward undoubted evidence that joints and limbs, long maintained in a condition of immobility, have suffered from atrophy of their component structures.

The evidence they advance in support of their views are beyond all question, and while contending against these gentlemen, we must, and with gladness, accept their evidence. They have presented us with excellent proofs—that from actual “surgical rest” we need not subtract. We are informed that :—

This subject seems to have attracted little attention amongst English writers on surgery. The three following papers, on the effects of absolute immobility or long-continued rest on joints previously healthy, contain much important information. M. Teissier (*Gaz. Médicale*, Sept. 25th-Oct. 2nd, 1841), relying only upon actual dissection of joints, shows that long-continued immobility may produce 1—Escape of blood or serum into the cavity, into the sub-synovial cellular tissue, or into the soft parts outside the joint. 2—Vascular injections of the synovial fringes, with formation of false membranes. 3—Alterations of the cartilage, e.g. swelling, softening, and erosion. 4—Anchylousis; this is shown to be not only frequently fibro-cellular, but, in one case at least, when the thigh was amputated for non-union of a fractured femur after twenty-two months of extension and immobility, it is proved that actual fusion of contiguous articular surfaces may take place. M. Teissier believes that the above follow upon an engorgement of the joint structures due to the suppression of synovial fluid, which in its turn is caused by the immobility of the joint. Dr. Menzel (*Arch. für Klin. Chir.* Bd. xii.) confirms the observations of M. Teissier by experiments on animals, whose limbs he confined in plaster of Paris: his theory as to the ulceration of cartilage is that it is brought about by much the same process as a bedsore, from the sustained pressure of contiguous joint surfaces upon each other. A third paper, very long

and elaborate, upon this subject will be found by Dr. Reyher, *Deut. Zeit. für Chir.* Bd. ii. Experiments on dogs are given in great detail, proving that in certain cases, especially where the immobility has been from time to time interrupted, ulceration of the joint-cartilage takes place. Sir J. Paget (*Clin. Lect.* p. 97) speaks of "adhesions in the ankle-joints of legs amputated after being long at rest, though the joints had not been evidently inflamed;" and Mr. Butlin has related (*Trans. Path. Soc.* vol. xxv. 212) a case of ankylosis of a knee joint, in a limb which had been kept straight for ten months for an ununited fracture of the femur. In rightly estimating the effects of rest itself in such cases due weight should be given to the following points:—1. that in a certain proportion, e.g. where the joint changes have followed prolonged treatment for fracture, the primary injury may have set up mischief in the joint, unnoticed at the time; 2. the possibility of the pre-existence of a constitutional condition pre-disposing to degenerative arthritic changes; 3. the proneness of certain joint-cartilages after young adult life to show signs of commencing degeneration. Dr. Moxon (*Wilks' and Moxon's Path.* p. 83) speaks of this as "degenerative erosion" of cartilage."

The foregoing quotation contains the two premises from which it is inferred that rest is said to be sometimes followed by an evil effect. If I were to canvass all the practitioners of surgery, and ask them—Would a direct force, or especially, an indirect strain, which would fracture a bone, also, before fracturing it, expend some of its violence upon a contiguous joint? The majority would answer in the affirmative, and many would add that fractures of the limbs could SELDOM happen without the contiguous joints being much strained or concussed before the moment of fracture, as the part injured acts as a lever, of which the joint is the fulcrum, and before the straining force breaks the lever the fulcrum is injured. If

* This is taken from Hilton's *Lectures on "Pain and Rest,"* third edition, by Jacobson, page 321.

there be a probability of the affirmative, then how very unreasonable it must be to credit the treatment of the fracture with the defects noted in a contiguous joint, which can have suffered indirectly. As to the real meaning of the term rest, taking the word as a surgical phrase, is a "treatment of even two months of extension and immobility" actual rest? The extension was probably a continuous pull with a weight, and the immobility was obtained by a splint, and a bandage, which compressed the whole limb. Is confinement in plaster of Paris rest? We are told it is not; but is a little "sustained pressure." In fact, the instances in which immobility has led to degeneration of structures are not examples of rest. Confining a lesion in plaster of Paris, or by compressing bandages, is not rest, but the opposite of it, and a method of starving and injuring a deceased part, which is already below the normal standard of vitality. Compression, even if combined with immobility, strictly defined, cannot be expressed by the phrase actual rest.

This distinction is of some importance to surgical treatment, as the non-recognition of what should be meant by the term rest has led others and myself into errors of practice. Illustrations of how the repair of fractures can be hindered by immobility, but encouraged by actual rest, the reader will find in the succeeding pages.

Before giving my reader examples of the method, which I now practice in order to avoid permanent defect of consolidation, I shall report the last two cases upon which

I operated with knife, saw, and drill. These cases were more instructive to me than the many others that I had hitherto operated upon, as the inferences drawn from observations, which were noted during their treatment, have enabled me to dispense entirely with interference by incision when fractures are delayed in repair, and to confine the treatment by skin incision, entirely to cases of true non-union, that is, a condition when the fractured points are not in contact.

Case 1.—Geo. Davies, on August 20th, 1870, was jerked out of a railway waggon and suffered a compound fracture of the left humerus. He was immediately removed to an adjacent public hospital, where he remained under treatment until January, 1871. In March, 1871, he re-entered the hospital, and as there was no repair, several loose pieces of bone, supposed to impede repair, were removed. He remained under treatment up to October, 1871, and then sought my aid, as the surgeon in charge of his treatment proposed amputation, on the ground that the arm was useless. The appearance of the arm when examined by me is illustrated in Plate I. Part VI. On manipulation, I found that there was an interval of one inch between the fractured points: in fact, they were utterly as separated there was not even the perceptible tough connection usually felt in cases of either delayed or non-union. He permitted me to operate and try to bring the fractured points in contact. On October 30th, 1871, he entered my hospital, then situated in Greta Street. While the patient was under an anæsthetic, I made a cutaneous incision over the left humerus (as shown on the right arm of the figure in Plate II. Part VI.), and then dissected behind a portion of the upper fragment of the humerus, exposing only the posterior aspect. I “scarfed” it with a saw, the skin and tissues over its anterior aspect not being interfered with. After this, by the incision indicated by A B in Plate II., the anterior aspect of a portion only of the lower fragment was exposed and likewise “scarfed,” at the fractured points they were then brought into contact, drilled and pegged, and afterwards the whole upper extremity was placed in a suitable apparatus for further maintaining contact and immobility. During the operation I found that the fractured ends were much coned, and allowed but a small surface for contact. After the operation, a moderate

amount of suppuration followed, and the pegs, becoming slack in their hold, were judged to be impeding recovery, and were removed about the end of the first week. The maintenance of the fractured points in contact was by no means an easy task. The patient passed several restless nights, and twice the upper fragment escaped through the wound in the skin, despite the attachment designed to maintain apposition. However, it was, finally, efficiently fixed and progressed so well that in twelve weeks, though with much shortening of the arm, there was firm union, and the connection felt very free from any redundancy of medium. The shortening is apparent on comparison of the right and left arm of the figure in Plate II. Part VI., copied from a photograph taken two years after the operation. In June, 1872, the patient, while using a spade and delivering its load with an extra jerk, again fractured the humerus at the site of the operation. On the day after this accident, he sought my aid again, when the arm was treated by a simple method of fixation. Repair was completed in six weeks, with much redundancy of connecting medium, which remains at this date, 1885.

This case gives evidence of the advisability and necessity of interference by knife and saw in cases of true non-union. At the time that I resected this humerus, it was my belief that nothing had been done to mar success. Now it is my opinion that success would have been more probable and that the second fracture would not have happened if some details of the operation had been omitted; for instance, the pegging and drilling. These two items had the evil effect which they have in most cases when performed on the shafts of long bones, a vital area, which, if compared with the required drill hole, is obviously a small one, and must suffer seriously by the drilling and strain of pegging.

Again, pegs, if there be any strain upon them, cannot long maintain their hold when inserted into living matter; and, as there is no difficulty in fixing fractures of the long bones

by external appliances, there is no excuse for the employment of pegging in resection. The refracture which happened must be credited to my ignorance of any method of increasing the amount of the connecting medium after operation. The amount of permanent callus could have been doubled in bulk by careful "damming" after the lesion attendant upon the operation had been healed. The refracture in this instance benefited the patient, and, like most refractures, was followed by rapid and stronger repair.*

Case 2.—Thos. H—, falling from a scaffold at the building of the Waterloo warehouses, December 6th, 1866, was taken to a public hospital near the building from which he fell. On an examination of his left leg, it was found that it had been fractured at its upper part, and that the fractured tibia had slightly punctured the skin. Subsequently suppuration took place at the site of the fracture, and in the fourteenth week a portion of the tibia was removed. About eight weeks after, the fracture showing no signs of union, the surgeon scraped the fractured points. In about nine months from the date of his entry into hospital, union being still delayed, the tibia was drilled and pegged. Sometime afterwards, by the aid of a side support, he left the hospital and resumed work as a bricklayer, though union of the tibia was still incomplete. He had been an inmate of the hospital a little over twelve months. In 1876, while working at the construction of a large "circus building," he fell again, and was taken to a neighbouring public hospital, where he remained eight

* Sixteen years ago, G. Evans, from the town of Hanley, Staffordshire, consulted me for delayed union after fracture of the humerus. I treated the case by careful fixation, which embraced the whole limb, and persevered for twelve months without succeeding. I then resected the points of fracture, and in ten weeks there was perfect repair. Twelve months after, while crossing a wet field in Mostyn, Flintshire, he slipped and fell, refraecturing the humerus; but on this occasion repair was completed in seven weeks. I now believe that, in the case of G. E—, an operation through the tissues was not necessary, and that the method of fixation then followed by myself and by a surgeon, who preceded me in the case, caused the delay of repair.

weeks. After he left there, he consulted me, when, on examination, I found non-union of the tibia and the patient unable to support himself with the left leg. Between the fractured points there was an interval of nearly three-quarters of an inch. At the patient's request, I undertook to try if it was practicable to mend his condition; and on October 28th, 1876, assisted by my neighbour, Dr. Richard Williams, the tibia was percussed with moderate force over the site of fracture. The effect of this was the production of a painful and intense tumefaction within an area of about four inches, and the skin appeared extremely tense; the leg was placed in an appliance for maintaining the tibia immovable. After the effects of the operation had passed away, we again, Nov. 28th, 1876, resorted to the treatment by percussion, employing about the same amount of force as that used on the first occasion. The effects which followed were not so noticeable as those which followed the first application of percussion. As soon as the signs of this operation had worn away, then, on December 15th, 1876, a third application of the percussion was tried. The effects of our violence on this occasion were still less apparent, producing only a slight increase in the bulk of the fractured points. On January 8th, 1877, percussion was repeated for the fourth time, but not much evidence of improvement followed, consequently, on February 17th, 1877, percussion was again tried, being the fifth operation of this character. On this occasion the effects of the operation were scarcely perceptible to the surgeon, and the patient expressed himself as having felt hardly any pain. In fact, both the after pain and swelling decreased with each percussion, so that on this, the sixth, operation, they were very slight. I now decided to employ percussion for the last time. On April 2nd, 1877, the tibia was hammered with an ordinary joiner's hammer, the skin over the bone being protected by a piece of basil leather. The force I employed was considerably more than I had ever before or have since employed; but to my astonishment, there followed only slight swelling and an easily tolerated amount of pain. In one month after this last trial of percussion, May 6th, 1877, I exposed the points of fracture, and with chisel and mallet, split their ends. In this operation I was assisted by Messrs. Williams and Parker. This interference with the bone did not give the result we hoped for, and further interference by operation was suspended; and ultimately I designed a method of fixing the points of fracture, so that the injury would be fixed while an area around the fracture was constantly "dammed." I have lately examined this case and found that the results of treatment are that the fractured points show no open space between them,

the connecting medium, though unconsolidated, is bulky, and by the aid of the apparatus for fixation, the patient can do a hard day's work without fatigue.

It is my opinion that, if I had, before treating the tibia, excised a portion of the fibula, so as to let the fractured points of the tibia come in contact, success would have crowned our efforts.

In these pages it is not my intention to attempt to compile a treatise on the general treatment of fractures, but to confine myself closely to a contribution to the subject, and draw attention to the foregoing principles and their value as guides to treatment, and I think the best way, is to give examples of the treatment of delayed repair, commonly called non-union, conducted in accordance with them.

In delayed repair, I suppose that the points of fracture are well in contact during treatment. The term non-union should apply only to those fractures which have resulted in a cartilaginous or otherwise connection, having formed between the points of fracture, the bony points not being in actual contact. Examples of delayed repair are not uncommon, while those of non-union are rarely met with. The gravity of delayed repair depends upon the locality. If found in the shaft of a long bone it is not so easily mended as when it occurs at an extremity, though more easily operated upon by knife or other means, as we have a greater surface of contact and abundant nutrient supply.

During the early part of my practice I invariably interfered

with the instances of delayed repair by either rasp, saw, wire or pegging, operating, upon an average, on eight to ten cases annually; but during the last ten years I have better succeeded without direct interference, although most of the cases submitted to treatment were less hopeful of success than any of my earlier cases. My change of opinion and practice commenced March, 1874.*

In the following pages I shall give practical illustrations of the method of stimulating repair which I have of late practised. The first seven of these cases have already been reported, but, as during late years I have learned much and have become better able to succeed from having added to my means of urging on repair, so I reproduce these cases, with comments thereon from my present stand-point.

“CASE 3.—The patient, Mr. John T—, of Southport, was admitted into my hospital on the 16th of March, 1874, suffering from fracture of lower ends of fibula and tibia. In this case there was so much abnormal motion between the fractured bones, permitting outward luxation of the foot, that the separated malleolus of the tibia nearly came in contact with the ground when the patient placed the weight of his body on the limb, the fracture threatened to become compound. The deformity was easily reduced, but recurred with the weight of the body to this extreme degree.

“As none of the usual methods could be applied in this case with any safety, I decided to try what effect a repeated application of percussion, with a rubber-protected mallet applied all round the site of fracture, would have.

“I accordingly commenced the treatment on the 20th of March, and applied percussion every second or third day for four weeks, desisting only for a few days when the parts became irritable. No appliance

* My views on the treatment of delayed union first appeared in the *Liverpool and Manchester Surgical Reports*, issued 1876.

whatever was used. From the first day of the operation there was a daily increase of consolidation and stiffness of the part, which continued until it resulted in complete bony union in the space of four weeks; and, on the 24th of May, the patient was dismissed from the hospital cured, though the lower ends of the tibia and fibula were considerably enlarged."

In this instance percussion was employed without supplemental fixation. The method used was a success. No interference then known to me could have succeeded more perfectly, as beyond the enlargement of the tibia there was no defect, whilst the risk incurred was very small indeed in comparison with the risk of any other known operation for delayed repair; but I now believe, that had mechanical support also been employed, success would have been made more certain.

"CASE 4.—On the 19th of March 1874, I was consulted by one Harry B—, of 30, Gradwell Street. This patient was suffering from a fractured leg, in the condition of delayed repair after sixty-five days' treatment. Assisted by my friend Dr. William Kelly the patient was placed under æther, and the tibia percussed carefully for ten minutes, the skin being protected during the operation with a layer of felt. The percussion was in this case followed by a considerable amount of swelling and irritation. The limb was placed in a suitable appliance, and at the expiration of four weeks complete consolidation took place."

I now think that in this case the "damming" of the circulation with efficient fixation, would have been sufficient.

"CASE 5.—On the 14th of May, 1874, I was consulted by John McA—, who was suffering from a fracture of the leg sustained on the 23rd of February, 1874, on board the steamer "Caspian." He had been in the hospital at Halifax for eight weeks, but on his arrival in England, suffered from delayed repair, and consulted a specialist in this town, under whose care he remained for five months. Afterwards he was for eight weeks a patient of one of the hospitals, and on the 14th of May became an indoor

patient in my hospital, when I performed percussion upon the tibia with the effect of consolidating the fracture in six weeks."

"CASE 6.—On the 1st of January last I was consulted by James K—, a coloured man, who had his humerus fractured while steering one of the Dominion steamers during a storm. The patient was two weeks at sea without receiving any professional assistance. On his arrival at this port he consulted me, and the fracture was fixed in an appliance and continued in that condition for two months with the result of only partial union. I noticed that, while the union seemed complete on making a lateral strain, it seemed to be quite loose if strained antero-posteriorly, imitating a hinge-joint.

"On the 28th of April I commenced to percuss the humerus, protecting the skin, and did so every four days, until there was a decided enlargement about the fracture. A rapid consolidation then took place, and repair was completed in a month's time."

Case 6 would probably have progressed to repair by "damming," but I employed percussion not having then discovered the other method.

Some four or five years ago a surgeon residing in the north-end of this town invited me to assist him in the management of a fractured humerus. The patient was, at the same time, also suffering from bronchitis, which nearly proved fatal; however, after six weeks' treatment, we found the fracture in the condition of delayed repair. In this case I practised the method of "damming" the circulation; but without any fixation, the primary splints being set aside. Perfect repair followed in six weeks, despite the error, on my part, in the discarding of all mechanical restraint.*

"CASE 7.—On the 15th of July, 1875, I was consulted by John McN—, who had fractured his leg on the 13th of October, 1874. He had been for

* Case of Mr. Walinsley, millwright and engineer.

ten weeks an indoor patient, and for fifteen weeks more an outdoor patient of an hospital. I found on examination that there was delayed repair, and decided upon operating. Æther having been administered, the limb of the patient was well percussed with a copper mallet, rubber-faced. During the operation the patient partially recovered from the æther, and getting possession of the mallet, almost succeeded in applying it to the heads of the operators. We succeeded, however, in disarming him, administered more æther, and finished the operation.

"The operation not being followed by much periosteal irritation I repeated it once every week for six weeks, but not under æther. The limb was retained in an appliance suitable for maintaining immobility, and on the 1st of September the limb was quite strong and well consolidated."

"CASE 8.—John Dark N—, on the 15th of June, 1875, fell into a ship's hold and fractured his thigh; was admitted into an hospital, where he remained seven weeks. At the expiration of this period he became an outdoor patient for three weeks, at the end of which, judging that the limb was becoming weaker, he consulted me, and I found, on examination, delayed repair of the femur. I operated by the 'percussion' method for a period of two minutes, producing a considerable degree of irritation. On the next day, and on every fourth day for three occasions, I repeated the application in a milder form. During this time and up to the completion of consolidation he was well fixed in a suitable appliance."

"CASE 9.—In January, 1876, I was consulted by Peter G—, who, while rescuing a fellow-workman from some machinery, had himself become entangled and suffered a compound fracture of the forearm (radius and ulna). The limb was carefully placed in a suitable appliance for a compound fracture, and was not disturbed for three months, when, on examination, I found that the radius had not united. I continued the treatment for two months longer, when, finding that the fracture was still ununited, I commenced to percuss the radius, carefully supporting the ulna from refracture, and continued the operation, every alternate day, for twenty-five occasions with the effect of greatly enlarging the radius. The radius became much stronger, with some amount of consolidation, but wanting in firmness; and, as the patient had excellent use of the arm, I did not advise further interference." *

* The remarks contained in the last sentence of Case 9 were not correct, though, at the time of publication, they appeared so. I had an opportunity of examining this man two years after I had judged repair to be impossible, and found perfect consolidation. I fear my too frequent percussion hindered perfect repair and lead

The preceding were my first seven cases treated by percussion. By the employment of these means active repair was induced and progressed to completion, despite the fact that I made some errors of omission in treatment. The following ten cases were prepared for publication in 1877-8.*

Case 10.—Arthur McN—, aged 31 years, fell from a waggon-shaft, January 7th, 1876, and suffered a fracture of both the tibia and fibula about two inches above the ankle. Immediately after the injury he was admitted into a public hospital, where the limb was treated, during the first 25 days, by posterior and lateral splints; but during the subsequent 42 days, the limb was encased in “Paris bandage.” At the end of which time gutta-percha splints were applied, and he was discharged from the hospital after he had been an inmate for three months. He now consulted me, and I found delayed repair, motion at the site of fracture being very perceptible when force was applied, either laterally or antero-posteriorly. While the patient was under the influence of æther, administered by my neighbour, Dr. R. Williams, the sites of the fractures were percussed. The operation was performed twice, with an interval of five weeks between each, with a result that in eight weeks firm consolidation was gained.

Case 11.—J. J—, on June 12th, 1876, consulted me for a delayed repair of fractures of tibia and fibula, situated about the middle of the right leg. The history of his ailment was, that he had slipped on the deck of a steamship during heavy weather and fractured his leg. In a few days after he was taken to the Smyrna Hospital, where he remained nine weeks, during which the limb was encased in “gum and chalk” bandage, in which I found the limb when the patient consulted me (June 12th, 1876). The bones were now urged to repair by percussion. One operation sufficed to bring about true consolidation in five weeks. The limb, before percussion was performed, was notably atrophied.

Case 12.—W. T—, aged 38, on December 22nd, 1876, was attending a vicious waggon-horse, when the animal seized his forearm and dragged

to the delay of recovery, as I have observed that for a few days after the operation from increased unsoundness the part becomes more mobile.

* It was my intention to have published them in 1878, but as the journal, to which I had been invited to contribute, ceased to be published, the notes were put by and not made use of until now.

him around the stable yard. Being released from the brute, the sufferer, feeling certain that he had received serious injury, immediately, without removing his clothes, went to a public hospital, where the injury was thought to be so severe that the surgeon proposed amputation. To this operation he would not consent, and came directly to my surgery. On examination I found compound fractures of ulna and radius. The whole upper extremity was placed in an iron "cage," which I used for compound fractures of either arm or forearm, designed both to fix the fracture and to enable me to treat the wounds by an open method and, at the same time, watch, as well as control, the symmetry of the limb. At the end of twelve weeks the compound nature of the injury was cured; but there was no repair of the fracture. The forearm was now placed in a pair of ordinary hollow sheet-iron splints. These were employed for a period of six weeks, but repair was still far from being completed. I now moderately percussed the fractures without an anæsthetic, and, at the termination of the fifth week from so doing, consolidation was completed.

Case 13.—J. J. D. H—, aged 3 years. This child suffered from a fracture of both tibia and fibula, which occurred at "birth," and, when seven months old, was brought to me for examination. I treated the injury by lateral supports, the use of which was continued for twelve months; but repair did not progress, and the case was taken from me. After being under other surgeons for nearly a year, the patient was again submitted to me for treatment. On this occasion there existed greater mobility at the site of fracture, and an extreme deflection from the normal symmetry of the leg. I reduced the deformity and irritated the site of fracture by pressing and rubbing the fragments together, and again applied side supports, which were continued for three months; but repair was not induced to progress. It was now decided to try percussion. While the little patient was under the effect of æther the operation was performed, November 7th, 1876, and as a result there was observed some degree of consolidation. The operation was repeated on December 25th, 1876, and during this application of percussion, much greater force was used than had been ventured upon on the first occasion. This last operation had the effect of bringing on a notable increase of consolidation.*

"Case 14.—W. T., aged 24, a sailor, was admitted into the Liverpool

* My notes of this case give me no further information, and as the case dates back to 1876, I cannot confidently trust to my memory; but I believe that the treatment was successful,

Royal Infirmary on December 29th, 1875, under the care of Mr. Reginald Harrison. The patient was suffering from an ununited fracture of the left thigh, which had been caused nine months previously off Cape Horn, by his being struck by a sea and carried against the bulwarks of the ship. No surgeon being on board, he was put up in splints and treated by the captain of the ship. On admission into the infirmary, there was an ununited fracture of the left thigh bone about the middle. There was a shortening of two inches. There did not appear to have been any attempt at union, the ends of the bone moving freely. A few days after admission the patient was placed under æther, when the limb was freely manipulated with the object of setting up action by rubbing together the ends of the bone. A long splint (Liston's) was then put on. At the end of one month there were no signs of any improvement. Subsequently the fractured ends were scraped with a tenotomy knife, but with no better effect. As the patient's general health appeared to be suffering from the confinement, I had the thigh and leg put up in paste-board and gum, and sent him to the convalescent hospital, allowing him to go about with crutches, in view of rescuing the ends of the bone on his return to the infirmary. He returned to the infirmary in July (seven months after his first admission), the condition of the fracture being unaltered. Before proceeding to resect, I determined to try the method of treating ununited fractures introduced and advocated by Mr. H. O. Thomas, of this town, viz., by 'percussion.' On July 19th, 1876, I placed the patient under æther and subjected the ends of the bone to a severe 'percussion,' or flagellation, with an iron-headed hammer, guarded by an india-rubber cap. This was readily effected by reason of the facility with which the ends of the bone could be directed against the skin; very considerable swelling, ecchymosis, and discolouration of the skin, in the vicinity of the fracture, followed this proceeding. The subsequent pain was not greater than that usually attendant upon fractures, and was only complained of when the limb was raised or shaken. A long splint was applied in the usual manner. One month after the 'percussion' I examined the limb. I found that callus had been abundantly poured out, and that union was progressing favourably. At the end of August there was a very considerable mass of new bone at the seat of fracture; but it appeared to me that union was not absolutely firm. I, therefore, on September 5th, again, but less severely, resorted to 'percussion.' This appeared to promote the desired end, for, when I examined the limb in October, before he left the infirmary, union was firm, and beyond the inconvenience of the shortening

previously alluded to, viz., two inches, the patient was well satisfied with the result. I believe the success of the case is entirely attributable to the first and very severe 'percussion,' as the consequences following it were of the most marked beneficial character and what is observed in the spontaneous repair of fractures. Had the patient not become somewhat restless and impatient, the second flagellation would not, I believe, have been required. However, by further confining the patient to his bed, it assisted in a measure towards promoting recovery. In performing percussion care was taken to avoid the position of important blood vessels and nerves."*—R. II.

Case 15.—R. P—, on January, 1877, while cleaning machinery when in motion, sustained a severe fracture of the left forearm, a short distance about its middle. This was set by placing it in a posteriorly applied, right angled, sheet-iron splint, extending from the shoulder to the wrist. This treatment was continued for eight weeks, with the result that, while restoration of symmetry was maintained, repair was progressing very slowly. I now removed the angular splint, and placed the forearm between two strong "pieces of pasteboard," upon which adhesive plaster was spread, with the usual calico band, and instructed the patient to discontinue the use of a sling, and let the forearm hang so as to induce it to swell. At the termination of three weeks from the change of treatment there was perfect repair.

Case 16.—L. J—, a native of Russia, while on the west coast of Africa in one of the mail steamships, was employed on the 3rd of March, 1877, in weighing anchor, when its cable "parted" and struck him down fracturing the radius and ulna of the right arm, which were set by the ship's surgeon. Six months after the accident I found that no progress towards repair had taken place; consequently, aided by my neighbour, Dr. Williams, I severely percussed the parts fractured, while the patient was under the influence of æther, and produced perfect repair in sixteen days. On the twenty-first day after the operation the patient went off with his ship.

Case 17.—R. W—, while at Port Said, on board the steamer Orion, March, 1877, was struck by a winch handle, which caused a compound fracture of the ulna of left arm. The arm was "set" at Port Said, but the patient shortly after became an inmate of the Malta Hospital, whence,

* When I was preparing the preceding cases for publication in 1877-8, Mr. Reginald Harrison favoured me with this report of the case and the very useful comments and the rule for the safe application of "percussion."

after remaining five weeks, he returned home. After he had been home two months, I examined the ulna and found delayed union. The ulna was now, June, 1877, well percussed while the patient was under the effects of æther. Firm repair resulted in three weeks from the operation.

“Case 18.—M. H—, aged 29, was admitted into the Manchester Royal Infirmary, November 18th, 1876, after fracture and delayed repair of right leg. This case had remained non-progressive for ten months. The leg was surrounded with felt, and hammered gently for five minutes, and the limb was then placed in an immovable apparatus. He was discharged January 12th, 1877, and has been seen since, when the fracture was found to be united.” *

Case 19.—W. J. M—, Chester, while shunting a railway waggon, September 7th, 1876, had his left humerus fractured at its lower third. He had very careful treatment up to April, 1877, when he sought my aid, suffering from delayed repair. While the patient was under the influence of æther, the operation by percussion was tried and repeated three times during a period of three months, but repair, though progressing, was far from being completed. I next injected a solution of iodine into the site of the fracture, and observed that repair was completed in six weeks afterwards.

I now think that it would be wrong to credit the iodine injection with the cure; the case was previously progressing, and would probably have consolidated without this interference.

Case 20.—Mr. M—, mate of a sailing ship, fell from aloft, January 28th, 1878, fracturing his leg about its mid-section. His captain acted as surgeon from the time of the accident until his arrival at Barrow, February 24th, 1878, and for four days after, when he consulted me. Though the time which had elapsed since the accident was a short one for completion of repair, I decided to percuss the tibia and urge on repair, which, from the appearance of the part, I judged was progressing only slowly. The result of the operation was a perfect cure in four weeks.

Case 21.—R. S—, sailor on board the British Queen steamship, while at Havre, January 22nd, 1878, fell from aloft and fractured his right humerus, and was treated for the injury at a public hospital. Six months after the accident, on examination of the arm, I found there was no

* This case was reported to me by Mr. Thos. Jones, who, I presume, was also the operator.

appreciable attempt at repair of the fracture. While the patient was under the influence of æther, the site of the fracture was well percussed, which so stimulated repair, that the arm was strong at the end of four weeks when he resumed its use. He fell again and re-fractured it. On this occasion simple fixation completed repair in three weeks.

Case 22.—J. D—, while shifting a bale of cotton, June 29th, 1878, fell and fractured his leg. He was immediately taken to a public hospital, and remained there, under treatment, three months. After leaving the institution the limb was submitted to me for inspection, when I found that there had been no appreciable progress to union of the fragments. The treatment adopted by me was percussion, and, when the irritation set up by this had partly subsided, the circulation around the fracture was impeded by interrupted “damming,” with the result that in four weeks repair was completed.

Case 23.—T. K—, a native of the Isle of Man, whilst on a voyage to Norway, slipped on the ship’s deck and fractured his thigh-bone. Eight days after the accident, he was taken to a Norwegian hospital, and remained there only while the ship was loading. He consulted me ten weeks after the accident. An examination of the fracture informed me that the repair was delayed. Now, while an in-patient of my hospital, the site of fracture was well percussed, and the limb fixed in a “Caliper splint.” At the end of six weeks after the operation, repair was nearly completed, and the patient went home to St. Mary’s, Isle of Man; but returned again at the end of three weeks, when repair was found to be completed, and mechanical aid was set aside.

Case 24.—J. D—, aged 28, when “rounding” Cape Horn, as the ship “Kate Keelock” pooped a sea, was knocked down and had his leg fractured. The ship’s carpenter acted as surgeon for fifty days, until the ship arrived at the Straits of Magellan, when the Government surgeon, stationed there, supervised the treatment, and encased his limb in a plaster of Paris fixture. The accident had occurred June 18th, 1878. The patient consulted me December 6th of the same year. At that time there was noticeable only a slight degree of attempt to repair. On December 7th, I commenced to remedy this by severely percussing the site of the fracture, in doing which I injured the skin. The operation was followed by much swelling and discolouration of the soft part around the fracture; a small abscess also formed at the site of percussion, which caused me to delay the application of splints until the 21st of December. While the splints were used I occasionally applied a tourniquet above the knee to aid

tumefaction of the leg, which I did, not then having found out the better method—which I now practice, that of damming uninterruptedly the site only. The result of the treatment was, in this instance, that repair progressed, but yet only slowly, towards consolidation. Though apparently completed by May, 1879, yet the patient did not feel the fracture strong earlier than October, 1879.*

Case 25.—J. H—, while on a homeward voyage, fell from the “fore-yard,” a height of fifty feet, fracturing his right arm and left thigh-bone. This occurred on June 25th, 1878. As soon as he arrived home he was admitted an indoor patient into my hospital, on September 4th, 1878. On examination, I found that the thigh-bone only required surgical assistance. As this injury remained in the state of delayed repair, the operation of percussion was performed, and the thigh fixed in a Caliper splint. Repair progressed so well that on October 16th he left the hospital, and on November 30th all mechanical aid was dispensed with.

The next case, I shall refer to, was one that crucially tested the efficacy of the methods, which I have introduced, to urge on the repair of fractures. It was my conviction, before commencing the treatment, that no plan of treatment would succeed.

Case 26.—J. T—, Ffynon Graig, Devil’s Bridge, South Wales, presented himself for treatment with an ununited fracture of left humerus, caused by a “chaff cutter” driven by water-power. The injury occurred nine months prior to his interview with me, January 6th, 1879. An examination of the injury made it doubtful whether the fractured points were in absolute contact. However, with this ill-omen, the operation of percussion was performed and repeated weekly for four weeks. The percussive force employed being only a moderate one, I also daily practised “damming,” for half-an-hour, the circulation around the fracture, so as to hinder subsidence of the tumefaction caused by the percussion. He was under my observation in hospital four weeks, during which period much progress was not observed. I applied no mechanical fixation beyond a sling around the wrist and neck, which I requested him never

* The first case to which I applied the practice of damming occurred about the years 1876-7. I was attending the late Mr. Finley Brewer, of this town, for a fracture of the right femur at the junction of the middle and upper third of the thigh bone. I applied damming interruptedly, by tourniquet, for about ten minutes daily, as the repair had shown signs of lagging.

to disturb until advised by me to do so. In this instance I did not administer an anæsthetic during the several operations, as the force used was easily tolerated, and I thought it desirable to operate often rather than severely. On one of the occasions when I was performing the operation, a medical friend, who had often assisted me at like operations, chanced to enter the surgery, and at my request examined the patient's arm, after which he asked if I was going to continue the treatment. On my replying in the affirmative, my friend much amused left abruptly. However, as no harm could result by persevering in a thorough trial of this plan of treatment, I persisted. On leaving my hospital, he remained at home a month, and again presented himself, when, on examination, I found some slight improvement. I again made several moderate percussions, and the short periods of "damming" were continued. After a stay of one week he returned home, coming back again in four weeks, when I found much improvement. The treatment was again repeated, and after another stay of a week, he was sent home with instructions to "dam" the circulation, daily for half-an-hour, until his return. On his next visit May 6th, 1879, an examination of the fracture showed perfectly sound repair.

The repair in this instance occupied a period of four months. During the treatment of the case I made one very important omission, the use of which would have shortened the time of repair. For, beyond slinging by the wrist, previously referred to, no fixation of the fractured bone was attempted. But this is excusable as I was yet only a novice in this mode of treatment. The fact, that repair could be best conducted in combination with efficient fixation, I had not devined; nay, I rather inclined to the belief that fixation was always a means of restoring symmetry at the cost of delaying repair, an error of theory thus leading me to defective treatment.

Case 27.—Joseph Drum, now a pointsman in the employ of the Tram-car Company, on the 22nd of October, 1879, fell from a ladder and sustained a compound fracture of his leg, and was carried to a public

hospital. In March, 1880, he presented himself to me for examination and advice, and I found a fracture of the tibia and fibula in the non-progressive condition, which I have termed delayed repair, with an ulcer about two inches in diameter, situated over the site of the fractured tibia, about its middle. The history, which the patient gave me of his case, was that he had been treated in hospital for thirteen months. The surgeon in charge, to remedy the defect of delayed union, performed the operation of wiring the bone or bones, which, not having the desired effect, was further supplemented by pegging the tibia which was done during the thirtieth week after admission into hospital. About the thirty-sixth week another operation was performed, and the fibula was pegged. After a sojourn of thirteen months and four days he left the hospital, as he objected to another operation which was proposed to him, and soon after he consulted me. My treatment of the case consisted, first, in the use of moderate percussion of both tibia and fibula, —avoiding the ulcer—and damming the site fractured, also in keeping the limb dependent all day. This treatment was immediately followed by good solid tumefaction of the whole limb, but especially of the part percussed and dammed, in which the ulcer was situated, which much increased the extent of the ulcer. This procedure was supplemented by a carefully maintained fixation of the leg by a posterior splint. The ultimate result was that in twelve months repair was completed, and now the ulcer was attended to, which the induced tumefaction had maintained in a chronic condition.

I attribute the long period spent in urging on to completion the repair, in this instance, as due to the frequent primary operative interference with the fractured points. The period during which the case was under my care, if considered without connection with his previous surgical history, would militate against my treatment; but when it is allowed that most of the recourses of operative surgery for such defects had failed, the time latterly expended in the case appears less extravagant. In the treatment of this case the full details of every method were employed—hammering, damming, depending, and fixing.

Case 28.—Thomas McClure, now residing at 10, Kenilworth Street, Bootle, while engaged discharging the “Baltic” steamship, fell a distance of thirty-eight feet, and suffered a compound comminuted fracture of the leg, a portion of the tibia protruding through his clothing. The accident occurred on July 12th, 1879, at 1 a.m., and the sufferer arrived at my surgery in one hour after the mishap. The fracture was in the middle of the leg, and, as the protruding portion of the tibia was loose, it was removed and found to be one inch and a half long, and inclusive of the bone’s diameter. Thus I had in prospect the management of a fractured leg with points of fracture not in apposition. During the first few months of treatment nothing of special interest happened, beyond the fact that the removed portion of bone appeared to be gradually replaced. However, at the end of about six months, when the space at the fracture had apparently been filled with connecting medium, and when the cutaneous wound had been cured, there was no progress at consolidation of this medium. I now commenced to apply moderate percussion, combined with damming, and continued the fixation. The leg was twice percussed while the patient was influenced by æther. The result was that, in thirteen months from the accident, there was firm repair, and no trace of the fracture.

Case 29.—On November 3rd, 1879, James Fernie, when superintending some machinery while in motion, was clutched by some belting, moving at a great speed. As soon as he was extricated from his perilous position he was brought to my surgery, when, on examination, I found a compound fracture of the left humerus, near its middle, the upper portion of which, in length three inches, covered only by periosteum, protruded through his outer clothing. On removing the patient’s clothes, it was also noticed that the outer half of the arm tissues had been torn, so that it appeared as if it had been done by a surgeon, with an intent to amputate by a flap operation; there was also diagnosed a simple fracture through the elbow joint. The compound fracture was reduced, and it, as well as the elbow, was fixed in an apparatus to secure immobility. Nothing of special interest occurred until after the first three weeks had elapsed, when, during an examination of the fractured shaft, I became convinced that the portion of humerus which I had noticed as having projected through the wound and clothing, was necrosing. This induced me to redislocate the upper fragment, and saw off two inches of its length; and, after again reducing it, means were employed to shorten the arm so as to keep the fractured points in co-adaptation. This was easily achieved. The only part of treatment found to be somewhat difficult was that of maintaining

the upper point of fracture deep enough in the tissues composing the arm. The accident had not disturbed the lower fragment from its normal bed ; but the upper fragment had been so extensively disconnected, that it required some care to keep it buried sufficiently to be constantly in line with the lower one. During the treatment of this case the patient was an inmate of my hospital in Hardy Street, where he remained until January 15th, 1880, at which date he went home, being so far recovered, that beyond a fixed and sealed sling, he was wearing no mechanical device. Though the fractured points were well in contact, the condition of the compound fracture was that of delayed union, and they very readily yielded to strain, and there were no signs of any superfluous callus. While he was at home I occasionally employed very moderate percussion around the site of the fracture, and "dammed" it so as to delay the subsidence of the tumefaction, induced by each operation. So well did the treatment succeed, that in seven months after I had the satisfaction of gaining firm union and with abundance of callus.*

When the foregoing case was last seen by me, it presented the appearance observed in Case I. as in Plate II., where the arm seems much shortened. In this instance, the protruding portion of humerus was returned, in the hope that it might survive the disturbance, but as soon as I found that necrosis had commenced, that portion which showed evidence of it removed ; for, if the consummation of the natural method of removal had been waited for, a greater difficulty would have arisen in getting the points of fracture into apposition and bringing about union.

Case 30.—During the latter part of 1881, I was requested by a practitioner, residing in a town situated about sixteen miles from here, to visit him and go with him to examine a fractured thigh bone. On my arrival at the patient's home, an examination of the limb revealed the fact that there had not been the slightest attempt at union. The patient

* This gentleman, being now in India, I could not get a sketch of his present condition for this volume.

was one of several who had suffered injury at a colliery explosion. The case had been under treatment many weeks. The patient and his friends had very unjustly expressed the opinion that there had been want of skill in the primary management of the limb. The real cause, in my opinion, being over care on the part of the surgeon, the fixation being too well maintained by circular compression--bandaging. Bearing in mind the opinion prevalent among the patient's friends, we decided to vary the treatment as little as possible consistent with the patient's interest. Consequently, the patient was fitted with a Caliper knee splint, and all pressure was taken from the site of fracture. This treatment was persevered in for six months when, perceiving that there was no progress to repair, I percussed the fracture on two occasions, with an interval of two months between each site of operation. Repair now gradually progressed, but so slowly that eighteen months elapsed before I ventured to advise the Caliper splint to be discontinued, and to consider repair perfect.

Biassed by the now generally received opinion as to the necessity of resection in delayed repair of fractures, many of my readers may think that this patient would have recovered with more economy of time had I performed resection of the bones; but my plea is that, in return for the time expended, the patient avoided at least, a short limb, some risk, and also saved some suffering, three evils attendant upon resection. My observations incline me to the belief that the certainty of cure, after resection for delayed repair, has been and is much over-rated. Even after resection, on making this fresh start at treatment, I contend that we unknowingly re-tread the old ground, that resection often fails. For example, in 1876, a surgeon, residing in one of our suburbs, invited me to assist him at a resection of the femur. The result was not successful. Why? because neither the operator nor myself knew of, nor had any person then pointed out, the most frequent cause of delayed repair,

Fixtures were so applied that the nutrition of the part was too much interfered with, and subjected the limb to a degree of starvation. This case, about twelve months after the operation, was subjected to amputation at Dublin, which terminated fatally. The fracture had been the result of a railway collision, and was treated first with the MacIntyre splint : then with the plaster of Paris bandage ; afterwards with a poroplastic felt, both of these being, in my opinion, excellent means for delaying repair. These means not bringing about a cure, the fragments were twisted and rubbed against one another ; this operation failed, when scarification was tried. This procedure also ended in disappointment, and the fracture was drilled and pegged ; and this method also failed. The surgeon and myself next resected the femur ; this again failed, as, from our sharing the common ignorance, we repeated, in our after treatment, the errors which very probably had caused the several previous failures of repair.

Case 31.—In May, 1881, John W. Jones visited me and introduced himself as coming from the farm of Tan-y-rallt, Cambria, Columbia County, Wisconsin, U.S., and requested me to examine his left arm. The examination revealed to me the existence of a fracture of the humerus at the junction of its middle and lower third, the points of fracture being in the condition of delayed repair and perfectly movable. To my inquiry, if he had come to this country specially for surgical treatment, he replied that he had. The answer rather disconcerted me, as I, from past observation, thought that a fracture so close to the elbow joint was one very unsuitable for resection, and yet no other method appeared likely to succeed. This unfavourable view of his case was expressed to him. He replied that nevertheless, if he was treated or not he would remain in this country seven months. Learning this, I proposed to try and remedy his defect during his stay. Before commencing treatment, he related to

me the following as the history of his fracture :—Three years previously, he was driving in a double horse waggon down a hillside road. The load proved more than the horse could control, and the waggon began to descend at a rapid pace, which so alarmed the driver, that he attempted to leave the waggon, and while trying to do so, fell and fractured the left humerus. He was attended to by a neighbouring practitioner ; but the result of six months' treatment was failure of repair. From this defect several surgeons of repute in his own State tried to cure him, but they failed to remedy the fault, and also declined resection. Consequently, he remained contented with the defective and useless arm, the condition of which much hampered his usefulness. In the early part of May, 1881, having ascended an elevation on his farm yard, the helpless condition of his arm caused him to overbalance himself, and he fell down. This so annoyed him that he immediately left home and arrived at my surgery sixteen days after the mishap. The forearm being placed at a right angle to the arm, as seen in Plate III. Part VI., was slung by the wrist from his neck, and subjecting the points of fracture to mild percussion every four or five days, and the keeping up of a prolonged tumefaction for a distance around, above, and below the fracture, by means of india-rubber bands. No special method of fixation was employed. This treatment was watched daily for about three months, when the patient visited the Principality, and spent some weeks with his friends, continuing the treatment ; and on his return there was apparent progress towards consolidation, which gradually improved, so that after eight months of treatment repair was perfect and the patient returned home. He, in March, 1882, reported his arm as now useful and gaining in muscular power.

This case, I think, may be accepted as testimony that we can, in the treatment of delayed repair, introduce a little more physiology with gain, and that we ought often to withhold from direct interference with fractures when the points of injury are in apposition. In this instance, I omitted an item which would have much shortened the period of repair—a non-efficient fixation, the omission of which was through ignorance on my part. The treatment was undertaken in 1881. My comments are being written in the year 1885.

Case 32.—H. Atkinson, a pitman, aged 25 years, now residing at 14, Stafford Street, Askam-in-Furness, first consulted me in May, 1883, having fractured his thigh-bone on August 10th, 1882, and that, despite careful treatment, the bone had not received its normal strength. An examination of the injured thigh revealed to me that repair was delayed. On May 13th, 1883, he became an in-patient of my hospital in Hardy Street, where he stayed one week. The treatment he was subjected to was that of having fitted, to the injured extremity, a Caliper splint, and being instructed in the art of damming the fractured part, so that he might return home and continue the treatment. My advice he carefully followed, and was rewarded by gaining perfect repair in the course of a few months. The exact date of its completion I cannot give, but when I examined the thigh on January 1st, 1884, the union was perfectly firm.

Case 33.—On January 6th, 1882, Mr. Pugh, of Birkenhead, had the misfortune to fall and compound fracture his right leg. The injury was followed by much swelling and extravasation of blood in the neighbourhood of the fracture. Dr. Ricketts and myself conjointly undertook the management of the injury. We placed the limb during treatment in an extended position, well fixed in a knee-bed-splint, and, both to ease the extreme tension of the attendant swelling and also to aid in maintaining its symmetry, we much elevated the lower extremity. Repair apparently progressed well; but when, at the termination of about six weeks, we removed the appliance which fixed the lower extremity, we found that consolidation of the fracture was not far advanced. Now the limb was encased in short splints and bandaged, and we hoped that, by allowing the limb to be more dependent, repair would be hurried on. Nevertheless, after keeping the limb the most of the time dependent, there was, at the termination of the sixteen weeks, only evidence of progressive repair. The leg was now moderately percussed and dammed continuously, and an appliance, permitting this change of treatment, was fitted to the limb. Soon after there could be observed evidences of progress towards consolidation of the fracture, which resulted in the formation of a permanently firm callus at the end of ten weeks from the date of the supplemental treatment.

Case 34.—Mr. Allansom was brought to my surgery, on June 18th, 1882, suffering from a very severe compound fracture of the leg, a very short time after the accident. The leg was enveloped in the standard antiseptic dressing which was supplemented with an apparatus to thoroughly fix the whole of the lower extremity; the limb was also moderately elevated

so as to ease pain and prevent expected swelling. The fracture and wound did excellently well, as there was neither constitutional nor local symptoms of irritation, and the wound was repaired without suppuration. At the end of the sixth week the patient left his bed, though union of the fracture was not firm. This, I had expected, as the injury was a very severe one. The limb was, at this time, firmly fixed with a short splint ; but after the lapse of six other weeks, there was not much evidence of gain in the direction of repair. At this date my patient, while superintending some building operation, caught cold, which, in a few hours, developed into an attack of erysipelatous inflammation, which involved the whole of the lower extremity injured, and the patient for several days was in a very critical condition. The local inflammation, as commonly observed, culminated in the formation of several abscesses, and the firmness of the medium of connection between the fractured points perceptibly diminished, so that, when all the local inflammation and its constitutional signs had passed away, the repair of the fracture was in the same condition of advancement as it was in the sixth week after the accident. I now devised an apparatus for both efficiently fixing and damming the fracture. Much consideration and care were given to its construction and fit, as I feared to resort to the method of percussing lest I should invite back the evil that had last to be contended with. The patient had the good sense to perceive the drift of the treatment and carefully seconded my endeavours, and our reward was, that in February, 1883, the fracture had so firmly consolidated, that the treatment was totally set aside.

Case 35.—Robert Hannah, 32, Gregson Street, on the 12th of December, 1883, during a sea voyage, slipped on the ship's deck. The accident produced a compound fracture of his right leg. The ship was now changed from her course and entered a harbour of refuge in Wales, and the sufferer was placed in hospital, where he remained four months, after which he returned home, and about September 10th, 1884, consulted me. On examination of the limb it was very obvious that the leg was in the condition of delayed repair. The treatment consisted in the application of suitable means, for fixing the whole leg, so as to permit me to "dam" an area around the fracture. This treatment was continued for ten weeks before true union had been secured.

Case 36.—Thomas Wilkinson, of Warrington, on July 2nd, 1884, fell and fractured both radius and ulna close up to the elbow joint ; he immediately placed himself under the care of an infirmary surgeon and was treated as an out patient of the hospital until September 5th, 1884. At

that date he sought my advice, when the fractures were in a condition of delayed repair—with the fractured ulna “riding.” The treatment adopted was that of fixing the forearm by lateral supports so arranged that there was no circular pressure on the area which included the fracture. This space was every month moderately percussed, and the forearm was always carried extended and dependent. In January, 1885, the fractures were found truly and strongly united.

The treatment, in this example of delayed repair, extended over a period of fifteen months, a very long time; but “the game was worth the candle,” as the patient has practically a normal forearm. If resection had been tried, and had been crowned with success, as regards the repair of the bones, still the mutilation and permanent defect of symmetry would have much detracted from the merit of the procedure. A resection, followed by the error—compression of the fractured area—made in the primary treatment, would probably not have secured consolidation.

Case 37.—Edward Hawes, 13, Seacombe Street, on April 25th, 1885, while on the sea in the sailing ship *Northumbria*, was washed away from his post at the steering wheel, when half-way across the Western Ocean, and had his left leg fractured. The captain of the ship, not feeling himself competent to manage the injury, appealed to his crew, and a “Dublin man” volunteered to treat the fractured leg, putting forward, as his credentials, the fact that he had, when suffering in a similar manner, been a patient of mine and had watched and retained in memory my plan of treatment, so that he could confidently repeat it. Thus qualified, the Dublin man treated his patient until they arrived at Quebec, when the sufferer was transferred to a public hospital where the limb was immediately incased in “plaster Paris,” which remained on the leg for four weeks and was then renewed. This last dressing remained on his leg until July 10th, 1885, the date at which he consulted me. On removing the plaster of Paris, it became obvious that there had been no progress towards consolidation, the fractures being easily shaken by strain in any direction. The treatment that followed, to urge on consolidation, was

that of firmly fixing the fractures with a short "Calliper" splint, leaving exposed and "damming" the site of the fracture and keeping the leg all day dependent. The result was rather surprising to me. At the end of six weeks there was firm and strong consolidation so that he resumed the use of his limb, and discarded all mechanical assistance.

Case 38.—Thomas O'Connell, 4, St. Mary's Terrace, Burlington Street, during a voyage homeward from East India, was in the ship "Cheswell," when a sea struck the vessel, April 6th, 1885, and caused him to slip on the deck and fracture his left leg. The steward of the ship took care of the leg until the patient's arrival at Dundee, April 27th, from whence the sufferer came to this town. He did not consult me until May 11th, 1885, about thirty-four days after the accident. On examination of the leg, I found that no attempt whatever had been made at repair. As the time which had elapsed since the accident was short, and the fixation had hitherto been very inefficient, I then made no special provision for urging on repair. This treatment was continued for a month, but no attempt at repair could be detected. Consequently, the leg was firmly fixed in an appliance which permitted the occasional practice of moderate percussion and continual damming. This change of treatment brought about a progress to repair, and on December 2nd, 1885, the leg was found firmly consolidated. The leg, at the site of fracture, was, while under treatment, moderately percussed every three weeks on four occasions.

Case 39.—J. M. Nicholson, during a sea voyage from Liverpool to New York, on board the s.s. *Helvetia*, sustained a compound fracture of the left humerus. The injury was treated for a few days by the surgeon of the steamship; but on his arrival at New York, on December 29th, 1883, about four days after the mishap, he was transferred to a public hospital. On the day of his entry into hospital, the fracture was fixed in a plaster Paris dressing, and this method of mechanical fixation was continued for three months, when the surgeon, perceiving no progress to repair, performed the operation of resecting the fracture; he then replaced the whole arm and forearm in the plaster Paris dressing, which the patient continued to wear until he arrived in Liverpool, five months after the date of his injury. On June 10th, 1884, the sufferer submitted his arm to my inspection, when, on the removal of the plaster Paris dressing, I found that there was no attempt at repair, and that the cutaneous wound, pertaining to the operation of resection, had not healed. The portion of bone operated

upon appeared to me to be that part of the humerus where it begins to change its form from the cylindrical to that of a plane, and where the condyloid ridges commence.

The surgeons, who were treating this case, erred, in the first instance, by employing a method of fixation which, so far as my observations go, is followed by the highest percentage of delayed repair and defects of symmetry. Again, after resection, while repeating the questionable treatment followed originally, another oversight was committed, that of not carefully neutralizing the weight of the parts hanging from the fracture, the elbow and forearm. This last omission led to the resected points not being in very close contact. Knowing the cause of failure of the primary treatment in Case No. 1, I was enabled to avoid the mishap of failure of contact in Case No. 27. Calculating from experience, I feared case No. 39 might not succeed.

On June 12th, 1884, the treatment of Case No. 39 was commenced, and I determined to conduct it somewhat experimentally, the condition of the arm being that of delayed union and with a large cutaneous ulcer. First, the forearm was slung from the neck by its wrist; the ulcer was attended to, and an area inclusive of the fracture was dammed. This treatment was continued for three months; but, at the end of that time, there could not be felt any increase of consolidation. Now, besides the treatment of the ulcer and a moderate damming of the area, also every three or four weeks the site of the fracture was moderately percussed. This treatment was continued four months, but I could not detect any signs of progression towards repair. After seven months of treatment, the ulceration was healed, and the limb was slung as before—dammed, percussed monthly; and further, maintained well fixed by a splint, and carefully redressed on the occasions when percussion was employed. Afterwards I found evidence that repair was progressing, and at this date, December, 1885, it requires some force to spring the connection.*

* I hope in a subsequent number of the "Contributions" to record the result.

The last case closes the evidence in support of my theoretical teaching, derived from observing the treatment of delayed repair of fractures.* If I had surmised, when commencing to modify my practice, that the change would have so much increased my success, my collected examples of fractures would have been more numerous and my notes of each case more copious. The reader will perceive that it was only gradually I observed that the practice either of damming or percussing a fracture to stimulate repair was deprived of much, and in some instances, of all its efficacy, if fixation was omitted in conjunction.

The confidence with which we may now predict a useful result, while treating fractures of the patella or of the neck of the femur, is the outcome of the practice of treating, the first, by damming and fixation; the last, by fixation and non-compression of the area which surrounds the fracture, as nothing should be applied to it that might lessen the blood supply. No other fractures

* Before ending my reference to percussion, as a means of bringing about an increase of bony structure, I will record an illustration not derived from the percussion of a fractured bone. A young girl consulted me who was much annoyed by the slipping of her patellæ, over the outer condyles, whenever the knees were flexed beyond a right angle. For these defects two strong leather knee-caps were worn, but they did not benefit them. It appeared to me that, if I could enlarge the upper surface of the outer condyles, then the patellæ could not ride over them. Before commencing treatment, I noticed that even by forcible retention with the hands, of the patellæ during flexion, they could not be hindered from riding over their outer condyles. After the right and left outer condyles of the femurs had been moderately percussed every week during five months, the left patella ceased to ride over the outer condyle of its femur, and after nine months percussion the right patella also ceased riding over its outer condyle; but not deeming this condyle as sufficiently enlarged, percussion is still being continued.

so well supply us with evidence in support of my theory as those of the patella. Up to a late date, a long period of reclination was judged to be essential to a chance of its useful cure; indeed, even the drilling and wiring of the bones, do not shorten the period of reclination; whereas, a patient with a fracture of his patella really need not be submitted to more than our usual diurnal reclination. To show that my change of opinion and practice was wrought by consideration and observation, and not merely from trying this or that method of treatment, I will give a short sketch of my mental progress :—

About eighteen years ago, there was brought to me, from the north-end of this town, a man suffering from a recent fracture of his patella. Directly after I had set the fracture, he informed me, that some years previously, he had suffered from a similar injury, from which he had not yet fully recovered; and further, that my late father had been his surgeon on that occasion. I now inspected the site of the former injury and found a separation of two inches between the two fragments of the patella, which were connected by a thin, much depressed, band. This observation induced me to exercise extra care to secure a better result from the treatment of this accident. The patient was kept reclining about seven weeks, the lower extremity elevated, the patella fixed in a ring, and the whole limb placed in a posterior support. My success was complete as regards keeping the fragments in apposition, but, after the patient had used the limb for twelve weeks, the limb treated presented all the defects apparent and to be felt in the other. Naturally, my disappointment was great. Before a year had elapsed, a sister of this man was brought to me, also suffering from a fracture of one of her patellæ. Again, during the treatment of this case, every detail of treatment then known to me was tried, but with no better success.

Afterwards during many years, I treated fractures of this bone with varying success—the result at times being perfect, and at

other times far from satisfactory. Such cases were always a source of anxiety to me.

About ten years ago, a man was brought to me, having a few hours previously fractured one of his patellæ. Before I proceeded to attend to it, he informed me that many years previously my father had treated him for a fracture of the other patella. Having gained permission to examine the ancient fracture, a careful manipulation of it failed to give me any evidence that the patella had ever been fractured. I commenced the orthodox treatment of the fracture with little hope of making a repair that would be symmetrical with its opposite bone. I followed the usual line of treatment, and the result was a perfect cure, not even a trace of the fracture remaining.

The result astonished me, not because it was my first instance of perfect repair and restoration, but the fact that both patellæ had recovered so perfectly, while, in the former example, both patellæ were not instances of good repair.

Soon after the last case, a sea captain called upon me for advice, with a fractured patella of the left knee. The fracture occurred some few days previously at sea. The injury was attended by very moderate swelling, and with only slight effusion into knee joint. On my tendering the advice that the limb should be fixed and that he should rest, he interrogated me as to what period of rest would be required. My answer was that at least six weeks would be required. He immediately replied that he could not afford the time, as he must leave, in a few days, with his steamer; and to show me that his decision was not without another and better excuse, he exposed his right knee and invited me to inspect it, adding that it was a case of spontaneous cure. On examination of the right patella, I found it fractured, the fragments being four inches apart and connected by a medium of moderate thickness, not enough to totally mask the condyles of the femur when he flexed his knee. He had perfect power of extension and flexion; defect of symmetry, but not of use.

My mind was so much enlightened by this time that I was able to divine why a limb with even such a grave defect

of restoration was not defective in action. The connection between the fragments, first, was sound ; secondly, during the period of inability to use his limb, the leg must have been kept extended long enough for the extensors of his leg to have accommodated themselves so as to neutralize the defect of restoration.* Very shortly after this consultation with the sea captain—

A man, by profession an acrobat, while suffering from a strained wrist, consulted me. After the wrist had been attended to, he exposed for inspection a knee joint, and, on examination, I found a fracture of the patella, with a separation of about one and-a-half inches. He informed me that seven months previously he had fallen, and that this was the consequence, and further, that he now suffered no inconvenience, and was well able to perform his daily duty.

My theoretical views having become modified, so my practice began to change. About seven years ago—

A milk-house keeper, residing in a street off Soho Street, was brought to me with an injury which was diagnosed by me as a rupture of the patella tendon. After warning the patient that it was a serious injury, and that probably some defect of use might remain, the limb was fixed, and the damming method was applied to an area above and below the seat of injury, the patient being, during the first six weeks, confined to bed. Much to my satisfaction, my unfavourable prognosis was not fulfilled. He recovered perfectly.

Soon after the cure of this case, I had to visit Huyton and attend a patient there with an injury in every way similar. In the treatment of this case, I adopted the damming and fixing plan, adhered to in the preceding example. The treatment resulted, as in the other instance, in perfect repair and restoration.

* By referring to footnote, page 51, Part II., the reader will find some etiological information, which, I think, is a contribution to the elucidation of the natural process by which a muscle can usefully adapt itself to an abnormal mechanical condition such as a fractured patella cured with fragments not in contact.

The next phase of my opinions was to believe that primary reclination, without interruption, was not required, if the interruption was not productive of discomfort, or mechanical disturbance of the injury : and shortly afterwards I had an opportunity of commencing to prove or disprove this conclusion.

After the lapse of about two years, the before mentioned milkman, who now resided in a street off Brownlow Hill, was brought to me with another knee injured, and on careful manipulation, I found it to be a rupture of the patella tendon. I at once placed the whole limb in a Calliper splint, and dammed the knee above and below. Next day he drove, and continued to drive daily, his milk cart from door to door, and made perfect recovery.

About the time of the cure of this case, my opinions and my practice became matured. I had frequently met with examples of perfectly useful spontaneous repair of fractured patellæ, especially in females, in whom they are nearly always the result of muscular action and attended by only a short separation of the fragments. Indeed, my experience incensed me with doubts, whether surgical treatment was hitherto any aid to repair, and with a belief that it was only of some help in bringing about restoration of symmetry. Observing the results of the practice of others and of my own, I was forced to the conclusion that perfect restoration of symmetry was of no value towards gaining a rapid cure and a useful result ; and that, in most instances, our over-anxious meddling, in trying to perfectly restore, hindered recovery and diminished the bulk and strength of the connection between the fragments, so that the feeble medium remaining could not

resist the strain of use; and, in consequence, it became unsound, stretching and permitting, at times, the fragments, even if well placed in contact, to part again; or if not in actual contact during treatment, to part further by use. It was also becoming evident to me, that something usually done ought to be left undone, and that the acme of treatment would be the adoption of some means that would be purely supplemental to the natural or spontaneous mode of recovery, so that the inherent tendency to repair would not be hindered. This surmise has proved so far true, that in practice, fractures of the patella and neck of the femur which gave me most trouble and anxiety before, no longer tried my personal skill or disturbed my mind.

The defective results, often noticed after the treatment of fractures of the olecranon, can be avoided during our management of this injury by omitting some details of our treatment which I hold are theoretically wrong, that is by avoiding any appliances which interfere with the nutrition of the part during the tendency to repair. I am advising a theoretical and practical reform of our treatment of the injuries of the patella, neck of femur, and olecranon, after an uninterrupted repetition of successes have followed my change of opinion and treatment of such injuries.

I will give here a notable instance of the treatment of a fractured olecranon observed by me this year :—

A rather delicate youth, aged fourteen years, was playing at foot-ball

when he slipped and fractured his olecranon and also the thigh-bone through the trochanter. The olecranon was treated, in a manner consistent with my present theoretical views, with a perfect result. The olecranon of the left arm had been fractured two years previously, but had recovered with defective restoration and use.

Here I had an opportunity of comparing results in the same subject, who, I know from observation during the treatment of his thigh bone, was possessed of a very feeble tendency to repair of his injuries.

This year, R. Pugh, 105, Beresford Road, consulted me regarding some trivial complaint. During the interview I remarked that I recognised him as having consulted me before. He replied that, many years ago, he had been treated by me for a severe injury to his elbow-joint ; he then uncovered his elbow for my inspection, when I noticed that he had recovered, with defective restoration, yet with perfect use. To test the extensive power of the forearm, I invited Mr. R. Jones and a friend to assist me, and although it was the left arm, we could not detect much less power between it and the right one, than should exist between them, yet there was a space of one and-a-half inches between the separated fragment and its base, with a fairly bulky connection. The gap was so great, that when the elbow was extremely flexed, the outline of the internal condyle of the humerus was apparent.

This was a case managed by me, when ignorant of my present knowledge of treatment, otherwise the restoration would have been a better one, and the connection between the fragment and its base would have been much stronger, though, as it remains, it appears strong enough, a thin sound connection being able to resist strain much better than a thick unsound one.

What would this patient have gained by the operation of wiring the fragments ? I know of two instances in which surgeons wired a fractured olecranon, when the fragment was

only quarter of an inch from its base, and the connecting medium bulky, but suffering the unsoundness from delayed completion of the reparative process ; the two operations were performed by surgeons ignorant of the theory of repair, and the recovery of those cases were delayed by their interference.*

The modification of our past practice, which I have advised for treating fractures of the neck of the femur, were suggested to me from observing that after injury to the neck of the femur in adults, whether fractured or not, in very many instances the patient became a permanent cripple ; and that spontaneous recovery occurred just as often without as with the surgeon's aid, useful cures being very rare. I noticed also that, the impediment to the use of the limb nearly always arose from a state, accompanied by symptoms which always indicate some inflammation of the hip-joint, with this slight difference, that we never observe the extreme deformity seen in the hip disease of the early period. This exception is explicable, as a fracture of the neck of the femur, or its simulation, during the declining period of life, cannot be accompanied by the extreme deformity noticeable at an earlier period, because the muscles attached to the trunk, which, by their unbalanced action, give us extreme deformity, have not sufficient stamina in the late period of life to act with uninter-

* The same want of knowledge leads us to resort to a round-about-away of correcting "knock-knee" by section of the femur, an operation that gives us neither gain of time nor saving of trouble, but adds much to the risk of treatment. It is very significant that such operations are performed almost entirely upon the inmates of our charities, and very rarely upon relatives of the subscribers to those institutions.

rupted energy in fixing the joint and producing the extreme deformity observed in young people.

To increase my success, then, in the treatment of fractures of the neck of the femur, which are always further complicated by articular inflammation, I practice the rules which pertain to the management both of fractures and articular diseases. It would answer no purpose here to record cases, as this injury is a common one, and my teaching may be easily tested.

I shall next refer to a few new examples of a manner of remedying the defects attendant upon ancient dislocations, when not reducible to normal symmetry; the success of the method depending upon a better knowledge of the principles of treating fractures, dislocations, and articular lesions in general. When undertaking either to reduce an ancient dislocation or to form a simulation of it, the degree of usefulness to be gained will depend upon the age of the subject, the gain is less as age advances. It is very advisable, to let the patient thoroughly understand the minimum and maximum profit likely to be derived from treatment, and also to amply explain the reasons for all that has to be done, as otherwise the patient will not be able to rebut the contra advice, which is certain to be offered him, by persons indoctrinated by past surgical and popular opinions. As an example of the propriety of my counsel I subjoin a note addressed to me this year—

THE P———, C———, NEATH,

Dear Dr. Thomas,

October 15th, 1885.

I am in receipt of your post card, in which you state your wish of seeing my boy again respecting his arm,

I am sorry to say that, owing to my delicate state of health, it is impossible for me to comply with your request, and taking to account what you said when we were there the last time, February, 1884, "that the arm did not require anything further done to it, that it was quite right, and that the arm which would go down and would not work up again was the one that wanted re-setting, and as his was working upwards all right from where it was, it required nothing but time."

I had such faith in you and everything you said, that I disregarded everything that was told me here about it, and never were instructions carried out more perfectly than I carried yours out, which I now enclose, but after this length of time I do not think that there are any more signs of its straightening than there were the very day we left you.

As I said before, it is perfectly painless and he can use it quite well as far as it goes. What is the cause of its remaining in the same position is a mystery to me. I am fully aware that your theory is, that the *muscles won't contract*; if so, what, may I ask, prevents it from going down? I am sorry for writing you thus, and must say that I am inclined to believe that there is no remedy for it.

From what I have said, I presume even without seeing him again you would be pretty able to form your opinion about it. I have such faith in you that I would not hesitate for one moment. Could you not give me an advice that I might try here?

I am under the impression that were the arm straightened with mechanical force, it would remain straight, which of course would be much worse than as it is. Trusting you will pardon me for thus troubling you,

I remain,

Yours faithfully,

W. E.

P.S.—I may add that no medical man hath seen it since we were with you.

W. E.

When dismissing this patient I had given his father the following written instructions—

"Retain in sling three months, at the expiration of which, give the whole upper extremity freedom and let me see the boy after three weeks of its use."

From a perusal of the foregoing letter, the reader will learn, that the writer thoroughly understood my instructions to him, and that I had spoken with much confidence, that a certain result would follow, if strict adherence to my advice were continued. My reply to the note was, that if, at the time of the release of the arm, there existed any motion of the elbow joint and it afterwards withstood the test of soundness, then taking the age of the patient into consideration, it must greatly increase provided no force or supplanting interference were employed, the extreme youth of the subject making it probable that, the range of action would ultimately approach near to its normal extent.

Through the kindness of an old patient* I am able to give the reader an actual proof in justification of my advice :—

This gentleman, when about ten years of age, was brought to me by his father, suffering from an unreduced dislocation of the elbow, which had existed four months. I made a simulation of reduction, and fully instructed the father how to manage his treatment. By referring to Plates IV., V., Part VI., the reader can estimate the range of action now possessed by my patient, the injured arm being as strong as its partner, and the result in no manner detracts from its utility, the symmetry only being defective. Plates IV. and V. are copies from photographs taken fifteen years after operation.

Plate IV. shows the extent of flexion, and Plate V. that of extension, possible with the elbow-joint, though it is only a simulation of reduction.

* D. H. Davies, Esq., Fernleigh House, Guilford Road, Brighton, who, at some personal inconvenience, called at my residence and presented me with two photographs, from which plates IV. and V. were copied. When he conferred this favour it was after I had lost sight of him for fifteen years.

Plate VI. illustrates another case of simulated reduction. When last seen by me, about five years ago, then nine months after the operation, there was no motion perceptible at the elbow-joint.

This patient, soon after the elbow-joint had been dislocated, sought relief at one of our public hospitals; where, although one of the leading surgeons examined his injury, the dislocation was overlooked. About six months after the accident, the patient consulted me. I performed the operation of simulating a reduction; a reduction was thought to be an impossibility. The result was, that despite the want of symmetry and motion, the improved position gained by the operation gave a very useful arm, so that the patient was able to take a situation as lock-keeper on a canal in the neighbourhood of Runcorn.*

In Plate VII., Part VI., is given another illustration of a

* The narration of this case brings to my memory a circumstance connected with it. Nearly all, who are, or have been, members of our profession, will very probably have had the unpleasant experience of being annoyed by captious patients, or their friends; irreconcilable individuals, who, from their constitutional formation, are always in a state of dissatisfaction. During the period I was treating the above case, one of these irreconcilables fell into my hands, but soon transferred his confidence to the surgeon who had overlooked the dislocation in the foregoing case. However, in transferring his patronage, my late patient did not utterly cease to communicate with me, inasmuch as an epistle was sent to me by his attorney. But it happened that I was equal to the occasion. Experience pointed out to me who it was that had probably inspired my late patient to give me this unwelcome attention. I addressed to the covert person a homily—not the first addressed to him during the last twenty years—which was so far effectual, that the captious man neglected me for a time, but finally visited me, and expressed his regret at having annoyed me. He confirmed my surmise, and supplied other information not interesting to the reader. During the period of the acting of the foregoing episode, the man with the injured elbow was contemplating again troubling his late surgeon in the form of a legal claim for malpractice, and consulted me regarding its feasibility. My answer banished the idea from his mind. It was not the first time that I had been obliged, from a sense of fairplay, to protect this gentlemen, from whom I have never received such, even in reciprocity. My contention has always been, and is now, that a practitioner, behind a litigious patient, is in a very dangerous and pitiful position—so placed, that if he be not exceedingly prompt in performing his duty to his neighbour, justly, he ought to be suspected of performing it as an adherence to etiquette, rather than as a homage to equity.

case of simulated reduction of a dislocated elbow, and in Plate VIII. is given a representation of the opposite and normal elbow. The notes relating to this case have been lost.

Plate IX., Part VI., and Plate X. are also taken from photographs of a case of simulated reduction of a dislocated elbow.

The patient was a girl, 10 years of age. The dislocation was a very marked one, and had occurred three months previously while she resided, in the year 1884, at Chili, South America. When the patient was brought to me for advice, I judged and, on trial, found that real reduction was not possible; consequently, a simulated one was made. The illustrations show the amount of flexion and extension gained at the end of six months after the sham reduction had been pronounced sound and the arm fit for use.

From the rapid increase towards the normal range of motion gained in so short a period, this last case is, in my opinion, very recommendatory of the theory of treatment. So satisfactory has been the result that, long ere the patient reaches the adult period of life, the movements of both flexion and extension will certainly have become nearly normal.

Plate XI., Part VI., represents another instance of simulated reduction of a dislocation of the elbow joint.

This had been overlooked by a late hospital surgeon, who, as he never suspected a displacement, violently practised forcible flexion and extension while the patient was under the influence of æther. The illustration was copied from a photograph taken nine months after my operation of simulating reduction. The result of this case was, that there remained a strong but ankylosed elbow joint.

The passive motion, resorted to in the primary treatment of the last case, must be blamed for the limited result that fol-

lowed after a sound simulation of reduction had been gained. To-day I am not able to perceive why passive motion is resorted to in the treatment of articular lesions, except it be to delay recovery—almost an absurd conclusion.

For many years after the commencement of my experience in surgery, I had the opportunity of observing the practice of those who had acquired a good reputation for skill as successful manipulators. Their forcible operations and passive motions were supposed either to lead to or hasten on the recovery of joints injured or otherwise unsound. I have sometimes assisted, and, on my own responsibility, have at other times resorted to these performances; and, for many years, believed that my interference assisted recovery. The patients recovered, so when I was in charge during the period of recovery, I credited myself with any good that resulted. All those joints, that were treated by passive motion, did not progress as was desired. I can well recollect that many a joint was treated by passive motion, and that the more this motion was given to it the more impassive it became. For some time I did not suspect that my practice was wrong totally, but that certain cases only were unsuited for a treatment which was excellent for others. This conclusion, combined with the acquisition of better theoretical information, led me to select my cases for the practice of passive motion, but long ago I have, from a more complete knowledge, confirmed by crucial tests, so selected them that I cannot find suitable cases upon which I would perform the

deception known as passive motion. And, whereas in the earlier days of my experience I believed that much aid was given to recovery by passive motion, now I know, by well attested facts, that some of the marvels of my past practice had been marred by the very treatment I was so proud of. It is true that during these latter years I have had reported to me cases of articular defect marvellously benefited by employing passive motion in their treatment, and many of them I have had an opportunity of examining, but in no single instance could I detect any gain. The reader may question, How did it happen that in the past you observed some benefit to arise from the use of passive motion in some articular defects, but that now you fail to perceive that any good, but rather an evil tendency, results from this practice? There is a solution to this question: The introduction into surgery of infallible tests for each joint, which indicate soundness or unsoundness, and ability to withstand wear or not. These tests enable us to expose as baseless the reputation attached to the employment of passive motion as a means of accelerating the recovery of their utility.

Joints that have perfectly recovered, either from injury or disease, regain motion earliest by their being employed in their ordinary manner. Joints that are not in a healthy condition automatically resent attempts at compulsory employment.* Passive motion applied to joints injured or diseased delays

* These regional tests will be described in those future "Contributions" devoted to practice mainly.

recovery, and if applied to joints cured it delays the event of complete restoration of function. It is lamentable that at this date, this injurious, at times, and always useless, practice is still advised in our text-books and periodicals as being the proper practice to employ for restoring the motion temporarily lost in a joint after lesion.*

This year I made a simulated reduction of a dislocation of the elbow-joint, which had remained luxated two years. The patient was Thomas Hestwell, a pitman, of West Houghton, Bolton. The dislocation was the result of an injury caused by a fall of a piece of coal on him when engaged at his work. Two attempts at reduction had been already made; and these having failed, the surgeons urged him to have the joint resected or the limb amputated, as the limb had set in an extended position and

* My readers will have noticed that I object to the practice of passive motion during the treatment of articular ailments, from a belief that its use is theoretically wrong, though I know that injured and diseased articulations have recovered after the employment of this manipulation. No better test of the correctness of my belief can be selected than the after treatment of an elbow, or any joint which may have been corrected by a simulation of reduction. If passive motion be introduced into its after treatment, failure is absolutely certain. The Archives of Clinical Surgery, U.S., August, 1876, contains a report of an arthroplastic operation upon both femurs, in the after treatment of which passive motion was so frequently resorted to, that it doubled the period of primary treatment, and the ease was reported before the result had been well tested by use, so that permanent gain of the object aimed at may not have been secured. The reader will also have noticed the objection I have to the use of long-continued circular pressure in the treatment of fractures and other ailments, of which the plaster of Paris appliance is a notable example. These two modes of treatment are the result of surgeons having taken a mere mechanical view of treatment. In these days we have a corresponding error of treatment committed by physicians. The chemical action of some remedies, applied locally, is taken as evidence of what their physiological action is, when taken internally. The living subject is looked upon as a mere chemical retort, hence antiseptics are prescribed, and are expected to act on the body, as a whole, much in the same manner as they are known to act when applied to pickle a wound. It is forgotten that it is not possible to embalm a man and let life continue. I am not contending here against the prescribing internally of antiseptics, but drawing attention, in the hope that they may be employed as other remedies are, with the purpose of producing physiological, not chemical effects. (See footnote, Part IV., page 53.)

was almost useless. Now the operation of imitating a reduction was performed by two manipulations, with an interval of four days between each, the patient being under the influence of æther during the first one. It was my opinion that three manipulations would be required, but I found the deformity easily rectified by the second manipulation. Professor R. Parker witnessed these operations.

I have, on many occasions, been so circumstanced, that there lay open to me only the choice of either performing a simulated reduction of a dislocated joint or leaving the sufferer much crippled by his defect. My experience, from performing these operations, extends to other joints besides that of the elbow; this plan of increasing the utility of the part having been applied by me to the shoulder, ankle and hip-joints. My reason for selecting examples of the operation upon dislocated elbows, is that these injuries are very common, and more often overlooked than any other luxation. Another reason that influences me is that the greatest triumphs, in connection with the repair of articulations, have been gained in the treatment of this joint. It has also given the best result after excision, from the fact that it is the joint of all the large ones, which is most amenable to successful treatment without this operation. I will conclude my reference to simulated reductions of displaced articulations, by giving two examples of this operation upon the hip-joint.

My opportunities for trying the operation of simulating a reduction of hip dislocation have been "few and far between," and the particulars relating to most of them have been effaced from my memory, as I neglected to take notes, not hav-

ing foreseen that they would have been of any use, beyond being mere records of personal skill, information which is more entertaining than instructive. It was only when my mind had gone through a long and slow process of evolution, that the value of the evidence "dropped by the way," became known to me. Here is narrated the first case of simulated reduction of the hip-joint performed by me; it was an accidental procedure, and an excellent result followed it; but sixteen years passed by before I became instructed so far as to know why the result has been so excellent. This case, for obvious reason, I have not forgotten.

In the year 1866, a seaman, suffering from a dislocation of his hip-joint, consulted me. The history he gave of the luxation, was that while he was discharging his duty on board his vessel, then laying in the Gulf of Mexico, he fell into the hold of the ship and dislocated his hip-joint, that six months had elapsed since the accident, and on his arrival in England, two attempts had been made to reduce the displacement; one attempt by a qualified surgeon, and the other by a celebrated "bone setter," assisted by his son, who was qualified. The displacement was an extreme one, and the limb was much shortened, with all the characteristic signs of dislocation upon the *dorsum illi*. When the thigh, leg, and ankle were dependent, the big toe was three and half inches short of reaching the ground. I decided to attempt the reduction, and to do so while the patient was under the influence of chloroform, to administer which, my friend and then neighbour, Dr. Bruce, offered his service. My plan of operation on this occasion was to tire out muscular resistance by employing the ancient method of reducing dislocation of this joint, using long-continued and gradually increased force, by extension and counter-extension, and to complete the reduction by the method of Messrs. Physie, N. Smith and Reid, so exhaustively demonstrated by Bigelow. The force was derived from the pull of several men, who grasped the extension and counter-extension sheets, the force being well maintained in combination with rotations of the lower extremity while the patient was unconscious from the effect of chloroform. After an employ-

ment of continuous traction for half-an-hour, and when it was supposed the muscles might have been stretched and well tired, the traction was set aside, and the reduction of the dislocation by manipulation was tried by myself. In this act some amount of leverage was performed, which proved more than the femur could bear, as it suddenly fractured with a very audible snap, close to, if not through, the trochanter. The bystanders all cried out, "It's in its place." Dr. Bruce and I exchanged glances only, and immediately placed the injured extremity in line with its fellow one; and we dressed it as though it were an ordinary fractured thigh-bone, employing extra means to gain a better length for the limb. The patient was then placed upon a suitable board and taken to his lodging, in a house opposite the old Pall Mall Chapel, in Highfield Street; and at a convenient time, I sought consolation and interchange of opinion from my colleague in the transaction. I certainly thought that the mishap was a very unlucky one, and from the anxiety it caused me, I gave to the management of the repair all the attention I was able. The result was certainly all that the patient wished, and I was credited with much acumen, which the reader must see was not due to me.

Plates XII., XIII., XIV. of Part VI. show the patient after cure; they are copies of photographs taken one year after the operation. Plate XII. was taken while the patient was standing with the spine straightened by raising the injured side with books, in bulk one inch. Plate XIII. shows the patient with spine "compensated," books removed and spine with lateral curve. Plate XIV. shows the amount of flexion possible—the other plates demonstrating the amount of extension after cure. A close examination of the photographs enables us to detect the outline of the femur head on the dorsum illii. The patient so well recovered that he again resumed his duty as a sailor. I now perceive that the useful result, which followed the accident of fracturing the thigh, must be attributed to the facts that my treatment of

the accidental fracture was continued long enough to make the bonds of connection between the head of the femur and the ilium to become thoroughly sound, and to allow the bodies of the muscles plenty of time to become perfectly adapted to act when the lower extremity was in the extended position, which is the best form for bringing the lower limb into use after injury.

I shall now narrate my last case of simulating the reduction of a dislocation of the hip-joint. I commenced the correction of this patient's ailment with no anxiety or doubt about gaining a successful result, and possessed of information that would enable me to know whether the case was succeeding or failing and how to secure the former or avoid the latter.

Andrew Rutter, aged 48 years, while performing his duty on board the sailing ship "Anglesea," on the 16th of May 1885, when off the Cape of Good Hope, was struck by a heavy sea and thrown across the ship's deck, thereby sustaining a dislocation of his right hip-joint. The captain and mate of the vessel tried to reduce the displacement but failed. On the patient's arrival into this port, he consulted me. On the 15th of August, 1885, assisted by my nephew (Mr. R. Jones) and Dr. Steele, I performed the operation of a simulation of a reduction of the displacement. Before the operation, our measurement showed that the attendant deformity made the limb three and half inches short of reaching the ground. The details of our procedure are these:—As soon as the patient was well under the influence of æther, the limb was forcibly flexed and strained, until the femur was fractured at its neck, the femur being guarded from fracture lower down by metallie supports, while the pelvis was fixed by the sound limb being held in an extended position, as well as by manual strain applied directly. After fracture, the injured limb was placed in a hip appliance, and the muscles were gradually made to accommodate themselves to the extended position of the whole lower extremity. During the first four days, our operation was not followed by any noteworthy symptoms, but afterwards, some gradually arose, simulating an

acute attack of typhlitis, which appeared rather critical; but as I had occasionally observed a similar condition, though not so grave, to follow even the gradual reduction of deformities attendant upon hip disease, it inspired me with hope, that, by treating the sympathetic inflammation in a manner that had succeeded in other cases, my patient would tide over the unexpected result. My surmise proved correct, for, after a sickness of about ten days, the accelerated pulse, high temperature, thirst, vomiting, abdominal distension and constipation passed away. In the meanwhile, mechanical treatment was not intermitted; the patient was kept reclining during eight weeks, and then he was allowed to leave his bed, wearing the mechanical appliance eight weeks longer, when it was set aside. Two weeks after it had been removed, there was plain evidence that the deformity of flexion was recurring, that the parts implicated by the injury and operation were probably unsound, and that the muscles were not sufficiently adapted to the position in which the limb had been maintained during treatment; consequently, the hip appliance was replaced and continued for another eight weeks, after which the injury withstood the test of soundness.

Plates XV., XVI., XVII. are copied from photographs of the joint, taken soon after it was judged to be sound.* Neither of these last illustrations show the extent of ability to flex the thigh as the period since recovery had not been long enough to allow the joint to gain a very obvious degree of motion, though it had some extent of voluntary mobility at the articulation between the ilium and head of femur.

During the twenty-eight years I have been practising my profession, I have witnessed only one case of accidental or spontaneous simulation of reduction of the elbow, but several instances in connection with the hip-joint, the examples which

* I have not appended lithographic illustrations of the appearance of these two hip cases before operation, as my readers are well acquainted with the deformity, symptomatic of a dislocated hip-joint.

I had met with had all been corrected during the period of infancy, but some years afterwards presented to me for advice, in order merely to amend the shortness of the injured extremity. There was not the slightest angular deformity when the simulated reduction of the hip-joint was tried by any "flexion test," nor any deduction from the normal range of action.

In a previous contribution to the theory of treatment, as well as in this one, a reference has been made to muscular accommodation or adaptation. By these phrases, I mean that certain defects may be corrected and others avoided by our adopting the theory that the treatment of some defects of muscular action must be so guided that, if we do not assist, we should not hinder a change which takes place in the body of the muscle of an injured or faulty part.* In support of my views, the reader is presented with a few examples, which if not conclusive to his mind, may be thought worthy of being repeated when opportunity occurs to him.

A few years ago a shipowner, residing at Glasgow, brought to me his daughter, a girl of eighteen years, suffering from Talipes Calcaneus, the result of infantile palsy. After we had consulted and agreed to correct the defect, the father requested me to examine the wrist and hand of the same side as that of the defective ankle. On examination, I perceived that the patient was crippled by a "drop wrist," also the result of infantile paralysis, and it was found that the cause of this defect lay in the body of the extensor muscles of the wrist, and that the original nerve ailment had almost worn away. Having gained this information, treatment was advised and hope given that some gain would result

* See footnote Part II., page 51.

therefrom. To my suggestions they assented, and the wrist was uninterruptedly maintained in an appropriate form for nearly seven months. Success so crowned our efforts, that the power of extension backwards over the line of the arm was gained.

Some three years ago, the son of a well-known cotton-broker consulted me for a defect in connection with his knee-joint. I found that he was unable to perfectly straighten it, and that the patella tendon of this joint was longer than the opposite one. In a sitting position, if he rested the heel upon the ground, while the limb was extended, the knee-joint permitted the thigh and leg to fall in a perfect line with each other. No evidence of disease or irritation within the articulation could be diagnosed. The history of the origin of the patient's defect, as given to me, was this: That the gentleman, while engaged in an athletic sport, slipped and ruptured the patella tendon, for which injury he received skilful and careful attendance, but with all this, defect remained, which he now desired my assistance to mend. Perceiving that my consultee was above the average intelligence, and knowing that the treatment would perhaps occupy some time and be some hindrance to his liberty, I decided to carefully explain the theory of treatment. He approved of my proposals, and primed with instruction, he left to continue his studies at one of the English Universities. While there, he had to listen to the gratuitous advice of friends, which induced him to send for an eminent Metropolitan surgeon, who very properly—as he thought so—informed him that if he continued the treatment, some permanent defect of motion of the knee-joint would result. However, as the surgeon's arguments did not appear satisfactory, he continued the treatment, informing me of his having consulted another practitioner only when he returned home. This patient's defect of use was perfectly corrected, but the patella tendon remained abnormally lengthy.

It is my opinion that, in the young lady's case, the defect lay in the body of the extensor muscles, which had been permitted, by the extreme flexion of the wrist for many years, to be overdrawn; and it is very evident that the defect of ability to perfectly extend the leg, observed in the gentleman's case, arose from the patella having been allowed to be drawn

up by the muscles during its disconnection, or the leg was not placed in perfect line during treatment. Whichever of these was the actual cause of defect, is of no consequence, when we know that even the normal muscle can so adapt itself to an altered mechanism, so that no impediment to usefulness can remain.

Herbert Moor, aged 21 years, was taken ill, in April last year, and was confined to bed for three months from small-pox and its sequelae. During the period he was confined to his couch, he suffered from pain in his right shoulder, which passed away ; but was again felt acutely in the left shoulder. After this last attack of pain had subsided, he rapidly regained health and left his bed, but noticed that his wrist was "dropped," and, as this showed no signs of improving, he sought advice from the staff of a public hospital, and was, for a time, treated as an out-patient, but was finally taken as a patient in-doors, where he remained for a month ; but as there was no signs of improvement, he left the institution and consulted myself. An examination of the arm convinced me that the original nerve inhibition had passed away, leaving only muscular defect. The diagnosis induced me to place the hand and arm in suitable relation, and this treatment was continued for two weeks, when, perceiving that very little progress was made, means were employed to arouse the muscles to quicker adaptation. This treatment succeeded so well, that after six weeks surgical treatment was set aside.*

On October 15th, 1885, I was requested by the delegate of a large trade association, to which I was honorary surgeon, to examine and treat the injury of J. Wallstenhole, aged 36 years, who was reported as suffering from an injured elbow. An examination of the joint showed me that it had been seriously injured, and had soundly recovered ; but the forearm was in the condition of "drop," with no power to flex it from the line of the arm. The patient gave as the history of his injury that he had fallen into the Graving Dock, thus sustaining a compound fracture of his elbow-joint, and that he was carried to a neighbouring hospital, where the staff surgeons at once judged his injury so extensive, that they excised the articulation. At the time I examined the joint, there was trustworthy

* My fellow-townsmen, Dr. Glynn, took an interest in this case.

evidence that the new articulation was sound, and I was satisfied that the lost power of flexion arose from defect in the bodies of the museles which flex the elbow-joint. My treatment was shaped consistently with this opinion, and after two months the power of flexing the forearm close to the arm was gained.

Miss G—, an employé in a large glass works at St. Helens, was, on the 23rd of April, last year, assisting to carry an half-inch plate of glass, three yards by half a yard wide, when the plate fractured into two pieces, one of which falling with its edge on her forearm, while in the semi-extended position, ineised through the skin and the whole of the upper portion of the extensor museles, denuding the head and upper third of the radius. The skin ineision commenced a little above the elbow, stripping and denuding half-way around the limb. The patient sought immediate assistance, and was so skilfully treated, that beyond the sear of the skin incision and a condition of “dropped” wrist, the case was excellent. The patient consulted me as to the practicability of improving the “dropped” wrist, after five months had elapsed since the accident. In this example, it was my conclusion that the remaining defect could be mended by attention to the bodies of the extensor museles, there being no nerve defect. This case was submitted by me to treatment, which so much improved the defect, that at the end of six weeks the patient could, by the act of the will, extend the hand; but on returning in two weeks afterwards, I noticed signs of a return of the deformity, and consequently again resumed treatment. The muscles had not perfectly adapted themselves to act under the altered conditions following the accident. This patient will probably require another month of treatment.

H. Dawson, aged 36 years, while employed as a joiner in a Tramcar works, about three years ago, was taken ill with lead colic, when on the first day of the attack, it was noticed that the forearm showed evidence of being affected, as he lost the power of flexion and extension of the wrist; gradually the constitutional malaise passed off, and the arm improved, so that he had the power of extreme flexion of the wrist, the hand, and fingers, but could only slightly extend the wrist and fingers when the hand was held in the position of extreme flexion; no voluntary power of extending the hand or fingers in line with the arm. Although, when this person consulted me, his muscular defect had existed three years, yet by applying treatment in harmony with my theory of the etiology of the defect, I had the satisfaction of seeing it proved, by the correction of the wrist in so short a space of time as three weeks.

These few examples of the treatment of "drop" wrists had been previously treated by the methods commonly employed by surgeons, and consequently, they were crucial tests of a treatment the outcome of a special theory.

My views regarding the accommodation or adaptation of muscles to action, under abnormal conditions, became matured by observing the effect of mechanical treatment upon the defect known as "dropped" wrist; and as proof that a method with a reason attached to it must be more efficient than a plan with no rule attached, I will here give the reader a sketch of my early experience in treating the defect of "dropped" wrist.

Although I have been qualified to practice my profession only twenty-eight years, yet, for many years previous, I had watched the practice of another practitioner, one who treated "dropped" wrists with much success. It is fresh in my recollection, that most of this practitioner's subjects were inebriates, who, after a carousal, would settle down to sleep, and overlay an arm or sleep with the wrist flexed, thus causing a "dropped" wrist, they would delay seeking advice for periods varying from a week to three months, and the period of treatment necessary to success varied from six weeks to three months.

For many years, I followed the details of treatment which I had watched another employ—mere routine—and my success equalled that of my predecessor; but gradually, as I divined how recovery must progress, then came a gradual process of elimination of details which hindered recovery, and others which assisted it, were added to my treatment, and the result of such change of plan has proved to me, that my train of thought was right by the fact that from the former average

time of treatment there was to be deducted a period represented by two-thirds.*

Before closing my contributions to the elucidation of some questions relating to the theory of treating fractures and dislocations, I shall relate to my readers my experience in relation to the so-called spontaneous fractures of bones and the clinical aspect of malignancy in bones. Although my practice has not been a speciality, nevertheless a great portion of it consisted in the treating of fractures and dislocations. The spontaneous fractures I have observed, may be, for convenience, divided into two classes—those in connection with malignant disease and those not connected. For many years when meeting with an instance of spontaneous fracture, I always prognosed the development of malignant disease of the bone, and it did happen that my judgment was verified; but gradually, as my field of observation became extended, exceptions were met with, so that out of three instances of spontaneous fracture of a bone, one would not be malignant. After having made several errors of prognosis, I

* I suspect that the past surgical treatment ought to be blamed for many failures to mend the rupture of muscular tissues. The most important example a practitioner may meet with, is rupture of the quadriceps extensor cruris, which is generally the result of extraordinary muscular effort. I can only recollect three such instances, and in two of them the muscle had parted close to the patella, and had been treated by surgeons of good repute; but the result of their treatment was so defective that there was no connection re-established with the patella, nor power to extend the leg. In the third instance, the quadriceps had been torn, as in the other examples, during muscular effort, but at its middle; the rupture not having been diagnosed, received no intentional treatment, the sufferer being only confined to bed, with the lower limb reclining and extended. This patient recovered with full power and use of his leg, a very slight indentation only being perceptible.

became more guarded in forming an opinion, so that now my conviction is this, that if a surgeon be called early to examine a real case of spontaneous fracture, it is very difficult, sometimes impossible, to diagnose the cause, and, at times, it may not even be suspected that the fractures has been caused by the onset of malignant disease. It is generally an easy matter to make out the nature of the ailment some months after the accident. To this I have observed exceptions, there being no evidence of malignancy in the bone even six months after its supposed "spontaneous" fractures. When the surgeon meets with the latter exception, the patient or his friends naturally, but unfairly, blame the practitioner. The most remarkable circumstance in connection with malignant fractures, which I have seen, is the fact that in several instances re-union took place, and in one instance the patient recovered so far that he was for a few months able to leave his bed and progress with some comfort with the aid of crutch and stick.

The first case of a spontaneous fracture observed by me was thirty years ago, while performing my duty as an assistant. The patient was a Mrs. McEvoy, aged about 35 years, residing in Athol Street, had a fracture of the thigh, which had occurred while in bed. We could not glean from the patient any previous history of having noticed or felt, before the advent of the fracture, any deviation from the normal condition of the limb. The fracture was treated, according to the mode prevalent in those days and united, but the patient never was able to leave her bed as malignant disease, in the course of four months, rapidly developed itself and terminated fatally in nine. This case was visited also by our fellow townsman Dr. Nottingham.

A retired marine pilot of the surname of Woodward, aged about 70 years, while earving a joint of beef, suddenly fractured the humerus. When examined by me, I prognosed the development of malignant disease. This

case did not remain under my supervision but the sufferer died from malignant disease nine months afterwards.

I was requested to visit and examine a very aged female in Pownal Street, Park Lane, and found while in bed she had fractured her thigh-bone. Suspecting that it had been caused by progressing malignant disease only, I prescribed no treatment. Six months afterwards the other thigh became fractured while "bed-ridden." No surgical treatment was employed and the patient died from malignant disease in eighteen months from the date of the first fracture of the thigh bone.

A person, who in business combined the art of coachmaking and trade of licensed victualler, invited me to visit and prescribe for his wife. On examination of the patient I found that she had a fracture of the thigh-bone, which had happened while in bed, and, further, that she was suffering from scirrhus of the breast. This case terminated fatally in six months after my visit.

A ship carpenter, who had been suffering some slight pain in the thigh and supposing it to be rheumatic, decided on a Saturday evening to bathe it with hot water, and, while fetching a bucket of cold water with the intention of heating it, suddenly feeling his thigh bone fracture close up to the trochanter immediately sent for me to treat him. Not suspecting malignancy, I treated the fracture in my usual manner. During the treatment there was not noticed any unusual symptom except, that to gain sleep, a strong opiate was required. The fracture united firmly, but with superabundance of callus, and in seven weeks the patient was able to go about, at first with two crutches and soon after with crutch and stick; but about the tenth week he began to feel the thigh bone to grow feeble and that the nightly opiate had to be made more potent, otherwise pain kept sleep away. This case terminated fatally from malignant disease fifteen months after the fracture of the thigh-bone.

By invitation I visited a Manchester tradesman residing in one of the outlying villages near that city. I found that the patient was suffering from a fracture of the thigh-bone in connection with malignant disease. His surgical history was this: that for many months he was supposed to suffer from sciatica, and, during the existence of the ailment, he made a slight slip on the pavement opposite his own door and caused a fracture of the thigh. His medical attendant, who met me in consultation, had very properly treated the fracture as an ordinary one, with the result that re-union had taken place; but only after re-union did the obvious evidence of malignant complication appear.

About three years ago a person from the neighbourhood of Springfield, near Wigan, suffering from an inability to use his right lower extremity, sought my aid. On examination of his thigh-bone, I found that the shaft of the femur had been fractured below its middle, and that it was in some degree enlarged. The history of this injury, as given me by the sufferer, was as follows :—On a winter's morning, the ground was slippery from frost, when he was going to his work, he suddenly felt his thigh-bone give way, though he had not fallen, so that he was obliged to get aid to enable him to return home. His medical attendant was brought to his assistance, but did not diagnose a fracture, his thigh remaining much in the same condition after three months' treatment, the period which had passed between the accident and my examination. At my suggestion he became an in-patient of my hospital. To induce union of the fracture, which I thought had only been delayed by inefficient fixation, the neighbourhood of the fracture was moderately percussed, dammed, and fixed in a Calliper splint. This treatment, after having been continued for a month, did not produce the desired effect. Now, a suspicion arose in my mind that the fracture of the shaft was not an ordinary fracture, but had been caused by a commencing malignant disease, and that union was prevented by the same cause. The patient was informed of this change in my opinion, and, further, that the signs of the disease would soon be very obvious, that early amputation ought to be performed, and that it would be advantageous to his recovery if he submitted to the operation at once. The patient declined to accept my advice, and informed me that he would try a shampooer, who practiced in Manchester. I now lost sight of him for a time; but some months after, one of my neighbours read a paper before the members of our Medical Institute, "On a Case of Amputation of the Thigh for Malignant Disease."

In the report of "the amputation," it was said that I had not diagnosed the disease, and it was hinted that I ought to have done so. That we all ought, we must admit, qualified, however, by an "if possible." There is, during the early period of the development of cancer, a time when the symptoms are not specially symptomatic of malignancy; once that period is passed, the unmistakable evidence of the disease appears. The cause of, and excuse for, the error I made at

first in my diagnosis of this case lay in the fact, that in the primary treatment, the fixation had been inefficient, which led me to attribute to it the delayed reunion and the thickening of the fractured shaft. The surgeon, who finds fault with those who fail to diagnose the early appearance of malignant disease of bone, must alter his opinion when he has an extended experience of such cases.

About the early part of last year, a physician, practising in a town about thirty miles from here, invited me to treat his wife, who was supposed to be suffering from some ailment in connection with the hip-joint. A manual examination of the patient gave me no information, until I applied the "flexion test," which showed some degree of irritation in the joint. The patient had been confined to bed some months, but with no apparent improvement of her ailment. We decided to supplement the past treatment of the case by the addition of a hip-joint saddle. This was worn for some months, with no benefit beyond obliterating the defect shown by the "flexion test." On consultation with my friend, the patient's husband, I expressed the firm opinion that we had malignant disease of the femur, secondarily affecting the hip-joint. In support of such an opinion, there existed no physical evidence; but I noticed that the night opiate would not have been required in a simple hip-joint inflammation of such moderation; and again, the local and constitutional symptoms were not improved by either medicinal or physical treatment. My prognosis was ultimately verified.

In a few months after this consultation, the physical signs of malignant disease became very apparent in the upper portion of the femur. A consultation with three surgeons gave further confirmation, one of whom was the gentleman, referred to in the former case, who believed that early diagnoses ought to be made. So he had another opportunity of being wise after the ripening of an event.

I will now give my readers some examples of spontaneous

fractures not caused by the development of malignancy in the bone :—

About eighteen years ago, a young lady, a resident of the Principality, consulted me as to the practicability of correcting a deformed knee-joint, ankylosed at a right angle. The opinion given her was that the deformity might be so altered that the lower extremity could be used for the purpose of progression in lieu of the crutch she was then wearing. A coming day was fixed upon for commencing treatment, but, before this day came, I was requested to visit the patient, then staying with friends in Victoria Street, and found her suffering great pain in the thigh-bone, close to the condyles. On examination, I noticed that some important change had taken place ; as a splintered portion of the femur could be felt almost projecting through the skin. In explanation of this untoward complication, the lady assured me that, while reclining on the sofa, she felt and heard a crack in the neighbourhood of the knee, followed by great pain. After consultation with several of my professional brethren, I advised amputation, as this last complication made us suspicious of the commencement of disease, with which it would not be advisable to temporise. Amputation was performed, and the patient recovered, remaining healthy ever since. On examination of the part amputated, we found the femur partially fractured, just above the condyles, the fracture being completely across the anterior half of the circumference of the femur, the posterior section being still in perfect continuity, and there was no malignancy.

About ten years ago, I was attending one of our "tug boat men," residing in Salisbury Street, suffering from acute inflammation of the left knee-joint. This joint had been for sometime fixed in a Calliper splint, and the patient confined to bed. After he had been in confinement about two weeks, he sent me an urgent message to visit him when. On my arrival, I found that while still in bed, his right femur had fractured at its middle. I decided to treat it according to my custom, and try to diagnose early the malignancy suspected by me ; but the fracture united and became perfectly sound. The left knee-joint also recovered perfectly.

Eight years ago, a blacksmith, residing in one of our outlying townships, suffering from a thigh fractured about its middle, was brought to me. The account he gave of his accident was that while he was walking across a field, his thigh-bone suddenly snapped in two. No information could be gleaned from him that would point out the cause of the fracture. I treated the case in my ordinary manner, and during the first six weeks he

appeared to progress favourably ; but, at the expiration of this time, his constitutional state became unsatisfactory, and gradually the physical signs of deep suppuration were palpable. Several deep incisions, reaching to the femur, were made, which gave vent to a large collection of pus. Abscesses also formed in the leg, which were treated likewise. Finally, the patient recovered, but when last seen by me, about seven years ago, he had ankyloses of the knee and ankle-joints.

About seven years back, a wire merchant, when driving along a country road, noticed that a sheep had become entangled in a pit of mud. He alighted from his gig and went to assist it, and, when in the act of stooping to grasp the animal, fractured his thigh-bone, close up to the great trochanter. He was not long in this condition before some person came to his assistance and, when he was conveyed home to Everton, his usual medical attendant was sent for, who carefully treated the thigh during nine months, but there was no progress towards repair. At the end of the nine months, I was invited to assist the surgeon in procuring union of the fracture. We conjointly gave our best attention to the fracture during another nine months, but union still remained incomplete, so we decided to fix the whole extremity in a Calliper splint, which enabled him to resume his personal attention to business. The patient was unwilling to submit to any method of immediate interference with the fracture.

In the management of this last example of spontaneous fracture—spontaneous so far, that the subject of the fracture was not at the time of the accident using, or being opposed to, any extra force—the first medical attendant erred in his treatment by so fixing the fracture that it was starved by the manner of applying the dressing to maintain immobility. Now I know that, during our conjoint treatment of the fracture, the probable cause of our want of success was that we both repeated the primary error.

Five years ago, Mr. R—, clerk in the London North - Western Railway Company's service, was walking down an incline purposely prepared for passengers to descend from the railway station attached to a small outlying township, when he suddenly felt his thigh-bone give

way. He was immediately assisted to his home, when he sent for me. On my arrival, I found a fracture of the thigh-bone. The treatment of the limb was conducted in my usual manner, and he recovered quickly and perfectly.*

About two years ago, an old gentleman consulted me about an enlargement of the head of the right humerus; its duration and appearance, and also the constitutional state of the patient, convinced me and several medical friends, who examined the case, that this was an example of advanced malignant disease of the bone. However, after observing the patient for four weeks, this diagnosis was found to be incorrect, as the disease, now evidently only periostitis, receded from the head of the humerus descending down its shaft and, when it arrived at its middle, became there localised. The patient was treated by constitutional remedies and local applications. During the third month of treatment, I noticed that the humerus was fractured. My friend, Dr. R. Williams, happening to be present, we carefully examined the fracture, and questioned the patient whether he might have strained or injured his arm, but he could not recollect having done so, and was rather incredulous when the existence of a fracture was announced to him. The fracture rapidly reunited again.

I had lately under treatment a case of spontaneous fracture of the humerus at the middle of its shaft. The patient, a young man aged twenty-four years, had been suffering much pain from what he supposed to be rheumatism in the arm. Suddenly the humerus fractured, and the pain ceased. He consulted me immediately after the fracture, which I fixed by the "interrupted method," and consolidation followed in four weeks, the arm remaining free from all pain.

The case of the youth, referred to at page 59, may have been an example of so-called spontaneous fracture, for, although the thigh was fractured during exercise, there was no information which pointed to special force having produced it, and the

* In this instance I never doubted but that it was a simple fracture of a non-malignant kind, as I had previously attended this person for a fractured leg and arm. I had also attended his son at different times for a fractured thigh, clavicle, humerus and forearm; also his daughter, for forearm and clavicle. The bones of this man and his offspring were unusually friable.

fact, that some twelve months previously he had fractured his left olecranon by muscular action only, leads me to suspect some fragility of his bones.

I have a second time referred to the last case, as it showed me that the signs, by which I thought that the malignant origin of the accident, which befell the carpenter, could have been diagnosed earlier, and also depended upon, as guides, to diagnose the malignant character of the disease of which the physician's wife suffered, are not trustworthy. During the first six weeks of the treatment of the fractured thigh in the youth, the remedies, both medical and surgical, failed to give their full customary benefit, so much so, that I suspected commencing malignancy ; but this suspicion proved groundless, I am now obliged to confess, that I know of no single sign, or collection of signs, that indicate the commencement of malignant disease in bone.

By referring back to page 51, case 39, the reader will notice that I promised to report the final result of my treatment of that example of delayed union. Three months have now elapsed since that case was prepared for publication, and I am now able to fulfil my promise.

From December, 1885, to March, 1886, the area of the fracture was twice percussed while the patient was under the influence of æther, and the other details of practice continued, and in March, 1886, consolidation of the fracture felt complete when I last examined the part ; but I feared to trust the limb without mechanical support, and I also purposed to percuss once more, so as to get a superabundance of callus, but greatly to my disappointment, the patient did not give me his customary visit for examination, but in lieu of it, I received the following letter, April 14th, 1886, which is here printed *verbatim* :—

NO. 2, WOODHOUSE STREET, WALTON ROAD,

DEAR SIR,

MONDAY, *April 12th.*

I trust, after a very careful perusal of the few following words, I may retain the same share of your favourable esteem as previously, and that you will not think too hardly of me, because, although I have done a deed which you would not sanction, and which was against your injunctions. Still, I must write and let you know all about it, because I know you have been so kind to me from a purely disinterested motive.

I daresay you remember me mentioning the "Faith Healing" some time ago, and to which you remarked that "It would be no harm to try it, but that you thought I should require *mighty* faith."

Well, I have tried it, and I am sure you will be glad to hear that my arm is not only in my sleeve, but in actual use, and has been for the past three weeks. The pain I bore after the last beating was something dreadful, and being in great trouble at my lodgings at the time, I was down-hearted. I was thrown out of my lodgings, and being quite destitute, I reasoned in myself, and came to the conclusion that if I really asked God to make it better right away he would, and I was told that if I would do away with all means and leave it to Him, it would be all right. So I just took off all your bandages and splint, and put it in my sleeve. I have now the use of my arm, and it is just the same as my right one—just as strong. Several times I called at your house when on my way to the Bethshan, George's Street.

I cannot describe how thankful I am, Doetor, for your past kindness and goodness to me, and that is one reason I have not seen you. I know you will be glad to see me with it in the sleeve. I am so busy looking out for some employment that I have hardly time to come, but will as soon as I can. I am about to take a shop in Everton, and am collecting money to start. I am getting a few pounds from a gentleman in Manchester at 10 per cent. per annum interest. When I have succeeded in getting enough I will be glad to see you. I have to pay it back in twelve months.

I know, Doetor, you will be glad to see me, and I am sure it will give me great pleasure to come and see you.

I am very well indeed—never enjoyed better health in my life, and only want work. I have not as yet succeeded in securing any, and have, therefore, made my mind up to take a shop which I have had offered to me for £15 10s. down, stock, goodwill of two businesses, and all fixtures. I could make it pay well, so I have set about collecting that amount at

interest. Should you desire to invest at 10 per cent. it would not only give me a living and help me to make a name for myself, but you would get your money back with interest. I can get personal good security.

Trusting you will accept my gratitude for your kindness,

I am, as ever,

Yours very truly,

TOM. M. NICHOLSON.

DR. H. O. THOMAS.

P.S.—Any communication will reach me if addressed to me at the above, *should you desire to write*.

On receiving this letter, I wrote to my late patient expressing my satisfaction at learning that he was so far recovered as to be able to use his arm, and requesting the favour of an interview. Three days afterwards he presented himself, and on my asking permission to inspect the part injured, he refused. I, however, suddenly grasped his elbow, but he withdrew it from my grip, and excitedly informed me that the oracle he now consulted had, by solemn affirmation, bound him from permitting me to interfere; and as the oracle probably often heard of my opinions of its utterances and deeds, the barring of me from inspecting the patient was politic.

The last information I received concerning this man was from a person who, soon after my interview with him, happened to be at a meeting of those deluded mortals known as “faith-healers,” and when my late patient addressed the assembly he informed them, untruthfully, that I had been so anxious to inspect his arm that I had offered a large gratuity for the privilege.

The good repute which the public and, with regret, we must admit, even leaders in our profession have given to

bone-setters, passive motionists and shampooers, with whom we must class Bethshanites, rests upon the fact that these unscientific practitioners get the charge of joints and fractures when their cure has been consummated, and merely preside during the resumption of function; they only watch the rising sun and profess to assist its course.*

When either a fracture remains after injury, so that it cannot unite, or if a joint, either injured or diseased, gives no indication of recovery, or from our knowledge of the nature of the lesion we can forecast that recovery is impossible, there remains to the surgeon a trial of one of two alternatives, either excision or amputation. The latter is rarely required after fractures, and is justifiable only for arresting the exhausting drain upon the patient's constitution after compound fracture. But the operation of excision after the fracture of a bone has been too frequently resorted to, having been frequently performed upon bones well in contact, whereas, it can be more restricted to bones not well in contact, and to those only that have to sustain perpendicular weight. As soon as we can acquire more knowledge of how much the natural process of adaptation and repair will give us, we shall more rarely err when either amputating or excising fractures.†

* I must also remind the reader that Miss G., page 77, did not continue her visit to me. However, of the ultimate cure of her case I have no doubt, if the treatment advised has been adhered to.

† In the *Lancet*, issued May 8th, 1886, there is reported an "exhibited" case of ununited fracture of the patella, in which the knee joint was excised to relieve "the defect of use." It is here reproduced:—"Mr. J. R. Lunn showed a case of ununited fracture of the patella in a man aged forty-four, in which there were four inches and

Joints injured or diseased, when they shown no signs that may lead us to think they can recover, should be amputated. From the practice of my contemporaries, it is very obvious that they favour a frequent resort to excision in articular ailments. My own opinion is, and always has been, that it is an error of judgment ; and since the publication of my views on this subject during and after the year 1875, the practice of excising joints has been less popular with surgeons. My contention has been that the joint, that can recover after excision, can

a half separation of fragments, for which excision of the knee-joint was performed, with excellent result. The patient (single) was admitted into St. Marylebone Infirmary in January, 1885. The family history was good. There was no history of syphilis or gout. He scalded his face and shoulders five years ago. He had fractured his left patella sixteen years ago, and union was obtained ; he again fractured the same patella six months afterwards, but it never united. He stated 'his life has been simply miserable ever since on account of the gnawing pains in the left knee ; and everyone used to think he was drunk, as his left knee used to give way under him, though he had worn a splint.' On April 14th, 1885, Mr. Lunn excised the left knee-joint, and wired the femur and tibia together with silver wire. The operation was performed antiseptically. Six weeks after the operation the patient's limb was encased in plaster of Paris, and he was allowed to go about on crutches. The reason why Mr. Lunn showed this case before the Society was that excision of the knee-joint was so seldom performed after the age of forty-two." The patient recovered from the operation of excision of his knee-joint, minus the hinge-joint, and I admit that the patient, by the operation, gained a more useful limb than he had before the procedure. It was exhibited as an instance of excising the knee-joint to amend a fractured patella, the portions of which, not being in contact, was thought to hinder the use of the limb. But I hold that the fact of the segments of the patella not being in contact was not the impediment to use, but rather, taking into consideration the particulars, as reported, that there were other and more important obstructions to the use of the limb, namely, that the medium of connection between the fragments was not sound—"gnawing pains in the left knee"—and that the treatment, anterior to the operation of excision, had never been directed towards enabling the extensor muscles to adapt themselves to act under abnormal mechanical conditions which they certainly can be made to do. This case comes to hand very opportunely, and enables me to point out that we have resources at our service which will enable us by very simple and safe treatment to gain better results than can follow even a treatment that requires a higher art.

recover without it ; and joints that do not recover after excision ought to have been removed by amputation.

Any joint, excised when the sufferer is under twelve years of age, is a joint that could ALMOST certainly have been cured. It is true that at times the sufferers may be so circumstanced that they cannot well maintain themselves during the period required for convalescence, or when the patient is an inmate of a public hospital, time is a consideration ; either of these excuses are sometimes taken as grounds justifying the excision of a joint.

My own personal experience is, that it often happens that joints, that appear most uninviting to treat, recover quickly, while others, that appear to require only a little assistance, may improve but slowly. With confidence I maintain that it is the duty of the surgeon to amputate a joint, when he feels convinced that it is not curable. However carefully and skilfully an excision may be performed, an amputation exposes the sufferer's life to less risk, and as the question of excision or amputation should never be entertained until the constitutional state—the key to the situation—begins to show that danger to life is approaching, it is then our duty to perform the operation which reduces to a minimum the risk of sacrificing the patient's life.

That the cure of articulations, when diseased, is very dependent upon the general vital tenacity of the sufferer, we may lay down as unquestionable. Of this we have distinct evidence in the fact that if those patients suffering, during

a long period, from a chronic disease of their joints, continue to improve in health, and maintain or gain in flesh, they generally recover. The excising or amputating of a joint, when the person so suffering continues even in ordinary health, is unjustifiable, as either operation leaves an avoidable defect ; but though this error of judgment is being still acted upon, it is noticeable that it is on the wane.

My personal experience of the operation of excision for non-union has been an extensive one, but of this operation applied to the amending of diseased articulations, my experience has been very limited indeed. In my early practice I excised fractures frequently, but now rarely, as I am able to "urge on repair" so that my patience is not tested to the excision point. Of the excisions of diseased articulations I have performed only two, both were adults, and terminated fatally, but one might have lived if amputation had been performed. Early in my practice I began to deviate from the ordinary path of treatment which leads to the condition which induces surgeons to perform amputation or excision of joints, consequently my opportunities for the performance of the operation of excision were but few, so that I have now but a very limited personal experience of this operation. But as I dwell in a large town endowed with several large hospitals, in charge of enterprising surgeons, who, inspired by the spirit of the profession in our times, prefer to cut mechanically what could be unloosed physiologically, I have thus been enabled to notice what can be gained by the excision of diseased

articulations. Thus situated, my observations have been ample and confirmatory of my opinion, and I cannot see that my having a great personal experience would have altered it.

In no single instance of excision of hip or knee-joints, though years might have had elapsed since the operation, did I observe recovery or any benefit, but the reverse. In every instance there were suppurating sinuses or an avoidable shortening, which, in comparison with the sound extremity, would go on up to adult age, an unavoidable defect peculiar to this operation, death being very frequent in adult life. Excisions of the elbow-joint observed by me, so far as the locality being sound, were often, not always, successful, but so far defective in use, that an ununited fracture of the forearm or arm would be just as useful; the best result I have ever inspected was far from approaching in utility a SOUNDLY cured and properly posed, even though ankylosed, elbow-joint. It was, for a long time, to me a difficult matter to account for the anomaly, that an excised elbow should generally recover soundly, whereas I very rarely meet with an excised hip or knee-joint, where either time or suffering had been avoided, or a sound cure gained. But I gradually discerned that to cure an elbow-joint required almost no more treatment than uninterrupted posing, and that is extremely easy to maintain; while during the treatment of diseases of the hip or knee-joints, they require the full rig of mechanical treatment, and that their application required more intelligence and art. The above is my explanation of the so-called brilliant results after excision of the elbow-joint. The

after-treatment of an excised elbow-joint is but a slight tax upon the surgeon's skill. But the after-treatment of excisions, performed upon either the hip or knee-joint, requires just as much consideration and manipulative skill as the disease did before the operation; and, as the errors of treatment which partly lead to the condition that was supposed to indicate the necessity for excision have been hitherto repeated after operating, it is not surprising that I generally found excisions of the hip and knee-joints in a worse condition than they were before such interference. It is beyond question that many curable cases of diseased hip and knee-joints have been excised and afterwards soundly cured. Such examples are continually exhibited before our societies and reported in the press. But it is very noticeable that unsuccessful ones, which constitute the greater number, are only rarely reported, but never exhibited; when these have had the supposed last possible means at the eradication of the disease applied, and are not soon cured, all methodical treatment is given up, and the sufferer, if under twelve years, probably lives, but his complaint runs its natural course of recovery, with deformity; if the patient is older, he generally succumbs to the operation and its sequæ, many a life being thus sacrificed that could have been saved by amputation.

It may be laid down as a trustworthy rule, that the longer the articulation has been diseased, the more certain it is that the disease is curable. That is, the limb can be made sound, so as to withstand the strain of use. The proper subjects for

excision and amputation are sufferers over twelve years of age, and when the disease has not retrogressed by six to eighteen months' treatment, and is overtaking the patient's vitality.

An articulation that has remained partly or totally useless several years, while the patient's constitutional state is maintained nearly at par, generally requires only a little more assistance from art to enable the natural tendency to cure to become completed.

I find that a professor of surgery now living has published a treatise on "The Pathology and Operative Treatment of Hip Disease," and in it is contained the following :—

"Movement of the new joint should be commenced at the end of three weeks, unless there is a painful symptom or condition of the wound, then the movement should be employed as soon as this condition has passed off."

No matter how skilfully an articulation had been excised, if the foregoing rule was adhered to during the after-treatment, no degree of operative skill would neutralize the evil that must result from this error in the surgeon's principles of treatment. This quotation contains, in fact, the policy of treatment that has so often lead to excising, and, as it is advised as part of the after-treatment of an excised articulation, it is not surprising that soundly cured excisions of the hip and knee-joints only rarely came under my observation.

I will now give an example typical of the results of excising joints met with by me. The first one here reported was performed by a surgeon of recognised ability, so we may suppose that the operation was well performed, though, in my opinion, the

after-treatment of operations are generally of more importance than the manner of performing the operation itself, just as a victory in war may be no gain if not skilfully followed up.

April 24th, this year, a surgeon called upon and informed me that, on that day a female, suffering from a disused hip-joint, had consulted him, and that she had been a patient of mine some years previously. From the particulars given me, my memory informed me that she was one S. McT., who, sixteen years ago, resided in Mersey Street, and was, when I treated her, suffering from hip-joint disease, and she so far recovered as to be able to perform her daily duties without any suffering. The treatment of this case occupied nearly two years, when she was by me judged to be cured, so far as their being no deformity; and daily use, during the subsequent ten years, is evidence my conclusion appeared correct. But about four and a half years ago this female sent for me to re-examine the hip-joint, when I found a large abscess had formed, whether connected with the hip or not I could not decide as the swelling was inflamed and near the point of rupture. I feared that in this instance the original hip complaint had not been thoroughly cured but it may have been an instance of the recurrence of inflammation. The patient's condition was further complicated by advanced pregnancy, her confinement being expected daily. This fact induced me to limit my treatment to releasing, by incision, the large collection of pus, and to defer mechanical treatment of the relapsed, or actual recurrence of, hip inflammation until after she had safely got over her confinement. This event she tided over successfully, but did not afterwards send me an invitation to treat the hip, as we had agreed to. This was the surgical history of this case, so far as I was concerned, up to four years ago, and the information given me by the surgeon, whom she this year consulted, led to my being a third time called upon to treat the case of this female, now residing at 14, Greyson Street. During our interview, the patient informed me that after her confinement, being in very straightened circumstances, she felt that if she accepted my attendance, she would have but a very poor chance of improving, as she was destitute both of friends to depend upon and means sufficient to get her necessities; being in this plight, she decided to become an inmate of one of our large public hospitals and walked there. Soon after admission, the senior visiting surgeon excised her hip-joint with the result that, from the time of the operation until now, a period of over four years, the patient has been able to progress only by the aid of

crutches, and has been in continual pain. From the site of the operation there has been a constant discharge of pus, and the ailing extremity is exactly five inches shorter than its partner.

This patient entered a public hospital suffering from a recent and slight impediment to the use of the limb. It was probably judged that excision of the hip-joint, at that time, would remove this slight symptom and any tendency to recurrence hereafter. This case was never exhibited! If it had been so far successful as to have become sound after excision, it could not have been so creditable a result as the part presented, nine months before the patient's entry into hospital, for, at that time, the joint had stood the wear of many years, and there was no shortening. I am by no means sure that my original treatment of this case was continued long enough to make certain that the hip-joint was perfectly sound at the time when I pronounced it cured. My opinion at the time was formed by my observing that there existed neither deformity or pain, nor any obvious evidence of there being any degree of unsoundness. At that period—previous to 1875—I had not discovered the infallible test which shows the total resolution of the disease, hence my present doubts whether the patient did perfectly recover. Still the fact, that a former patient is able for years to go about without either a crutch or any supplementary assistance, though not trustworthy evidence of perfect recovery from disease of a joint, yet may be accepted in support of the probability of a cure. It is not generally admitted, nevertheless it is a fact, that sometimes joints, even elbow joints, after perfect cure has followed

their excision, do in after years suffer from recurrence of inflammation. Excision is not a better protection from a recurrence of inflammation, than a *sound* curing of an articulation, for once a diseased joint has been perfectly freed from disease, there is no special tendency to its recurrence. No more can be said in favour of excision of joints. The reason why we have in past times judged articulations, which had been once inflamed, to be liable to a recurrence of the disease, arose from the fact that, in the majority of instances, the joint was pronounced cured before it was so. Then we had to guess the condition of the part, whereas now we have a strict rule that guides us to a trustworthy conclusion, and by which excision will be removed from its high position in our conservative surgery.

In the majority of cases of injured or diseased bones, which the surgeon may be called upon to treat, besides exercising manipulative skill, he may be required to prescribe medicine, and lay down a special or amend the ordinary diet for the patient. In a previous "Contribution," I have given a sketch of the principles which influence me when composing a prescription. They are somewhat similar to those which influence me in selecting certain methods when applying mechanical aid to the patient's relief. Medicines may be prescribed to act directly or indirectly; that is, remedies may be intended to produce their physiological action in the affected part, but if this is so disturbed that it cannot respond, the indirect method of prescribing may be followed. We may influence the

sound parts, and thus affect the diseased ones, just as our mechanical aids may be applied to healthy parts to secure rest to the diseased locality ; or if the part, the use of which is not possible, admit of the application of mechanical aid without materially hindering its recovery, the appliance may be attached to it. All this, having been previously discussed, need not be more than referred to here. But the dietary of patients, suffering from abnormalities of the skeleton, has not been commented upon by me elsewhere, and as it is an item of treatment which may, at times, materially influence the progress of the local injury or disease ; and further, as it cannot be said to be a remedy restricted to any locality, its discussion here will enable me to avoid much recapitulation, when demonstrating my method of treating special localities.

It has been my habit, when treating special injuries of bones, sometimes to restrict the diet ; but when treating "non-congenital" deformity, arising from malnutrition, to amend the diet. When treating diseases or injuries of the bones, the diet may or may not require selection. First, the restricted quality of food is advised if a patient has fractured his ribs, compound-fractured his thigh or leg, or has had an amputation ; for, after the surgeon has applied his aids to recovery, it becomes of the utmost importance that the sufferer should gain all possible ease from pain, and avoid, as much as possible, disturbance. The act of defecation is the greatest annoyance to him during the first fourteen days of his suffering. How can we enable the patient to avoid this, and also permit the

administration of sedatives, if required, without, at the same time, causing discomforting constipation, until about the third week, when the sufferer is more at ease and better able to help himself and his assistant? All this the surgeon can arrange for with perfect safety and comfort to his charge, if he adheres strictly to the following dietary, until the first and second spontaneous actions of the bowels take place, which, despite the sedative, can seldom be delayed beyond ten to fourteen days. I will give here an ideal case.

Mr. A. has just suffered a severe fracture of the ribs, the pain from which interferes with his breathing and completely incapacitates him from moving in or leaving his bed without inducing painful spasm of the intercostal muscles. As soon as the local injury has been manipulated and the patient has been placed comfortably in bed with his trunk pillowed upon an incline, the nurse and his friends are informed that it would, as they could obviously perceive, be a great advantage that the patient should not be disturbed, by having to use a bed-pan, until he feels much easier from pain, and they are informed that I do not necessarily care for an "action of the bowel" before the fourth week, but that I fear we shall not be successful in maintaining the constipation so long. I also inform them that to do this with comfort and safety, his diet must be restricted in quality in order to avoid aperients. In fact, the diet is that suited to the period of convalescence after obstructed bowel: Morning meal, bread and butter and tea; mid day, some flesh broth, no solid; evening meal, biscuit and butter and tea; supper, arrowroot made with water, some brandy and nutmeg. The patient is visited daily, and about the tenth to the fourteenth visit I am abruptly informed that the "bowels acted to-day, sir," when my answer might be, "Ah! I thought we would fail to constipate him as long as I could have liked; how did you manage him?" "O he got on the bed-pan himself, we had no difficulty." Now I carelessly remark, "Well, it is no use being particular about his food any longer, let him feed as he chooses, and do not give him any more of the soothing medicine (opiate), but instead, let him have a little spirit and water at bed time."

Instead of supposing Mr. A., in the preceding example, to be suffering from fractured ribs, let us suppose either compound fractured legs, an amputation, or any condition in which for a time movement of the body gives pain or delays recovery—not actually an urgent case of bowel disease—then the advice may be trusted as being supplemental treatment that will certainly be an unalloyed benefit. This advice, strictly carried out, is certain to answer its purpose. And as it is in action, in great part, a mechanical act, it is almost as dependable as that section follows the action of a saw applied to a piece of wood.

Patients, most of them being children under three years of age, are brought to the surgeon suffering from deformities which have arisen during the post-congenital period; as for example, splay feet, bow legs, knock-knees, palsy of the extensor muscles of the extremities, and mal-developements—much depending upon errors of feeding and the urging of children to assume the perpendicular position too early.

It is my experience that a reliance upon information to be derived from those in charge of youth may lead the surgeon astray. Nearly all nurses will affirm that they take sufficient care of their charges, and the majority will emphasize their assertions by informing us that they expend extra attention upon the child. This may all be true. But the child may not be correctly managed, and it must assist the surgeon if, before consulting the patient's friends, he can conclude whether the child has been appropriately fed or not. Many children do well with any quality or quantity of food, but then they are

not brought to us for advice. My rules for divining whether the food suits the child or not, are these :—

If the skin of the face, notably the cheek, is not glossy and smooth but roughened, I know the quality of the food is too concentrated.*

If the abdomen is globular and elevated, projecting beyond the elevation of the sternum, the quantity is too great.

If the abdomen is elevated, projecting beyond the level of the chest, and broad, I conclude that the quality is too coarse.

Any or all of the three preceding signs may exist in the same subject ; and the surgeon having noted them, can, if he strictly cross-question the nurse, elicit information which must lead him to detect the item of diet which caused the physical signs, and afterwards get his diagnosis verified by the disappearance of the physical signs during the three or four months consumption of an amended diet. It is quite beside the question to be informed by the nurse that several of the same person's infants did well by the diet now in question ; the surgeon's reputation for skill depends upon his treatment of the one under inspection.

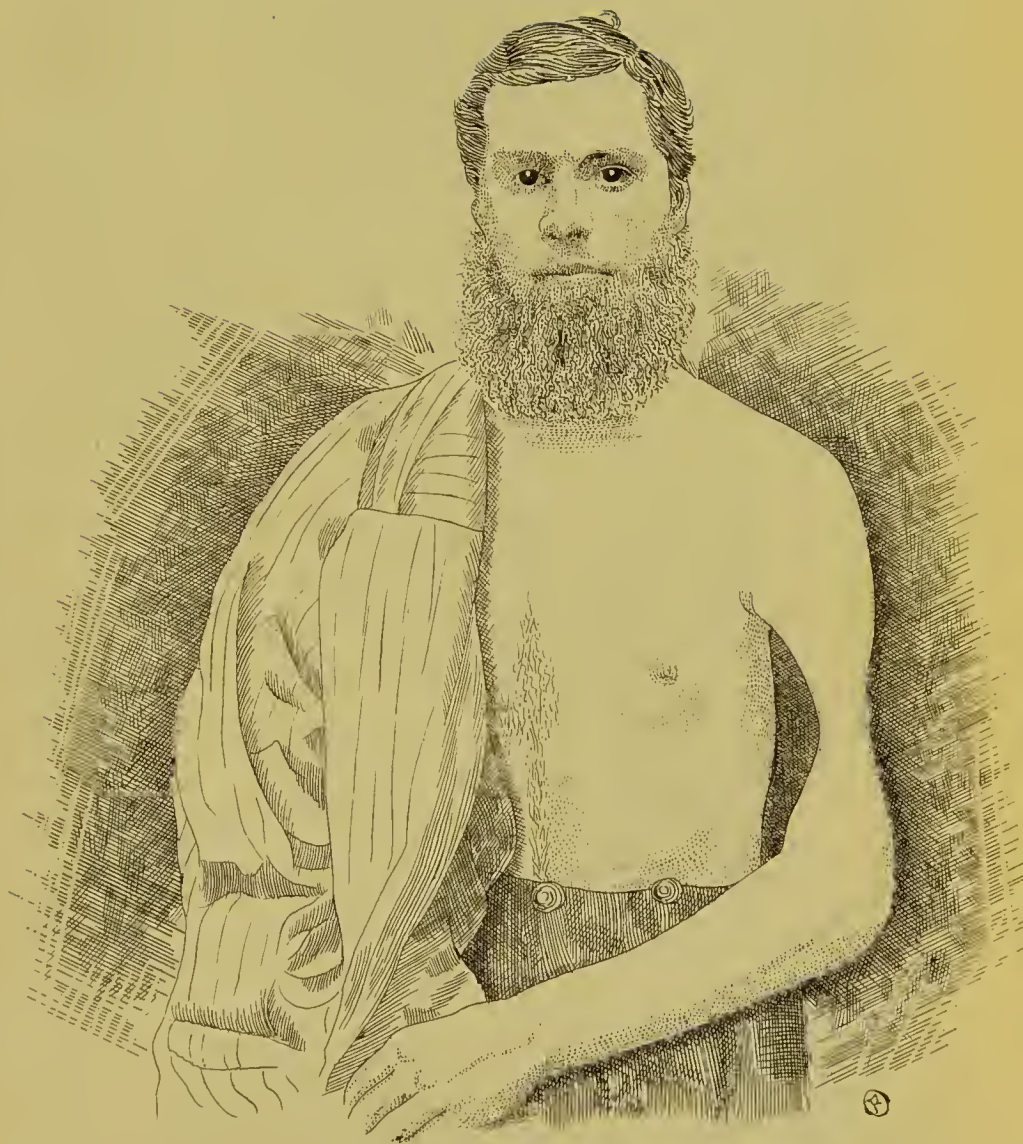
When treating diseases affecting the bones, it has been my rule not to interfere with the usual enjoyments of the patient, provided his chylopoietic viscera are healthy. If any deviation from their normal condition be observed, the

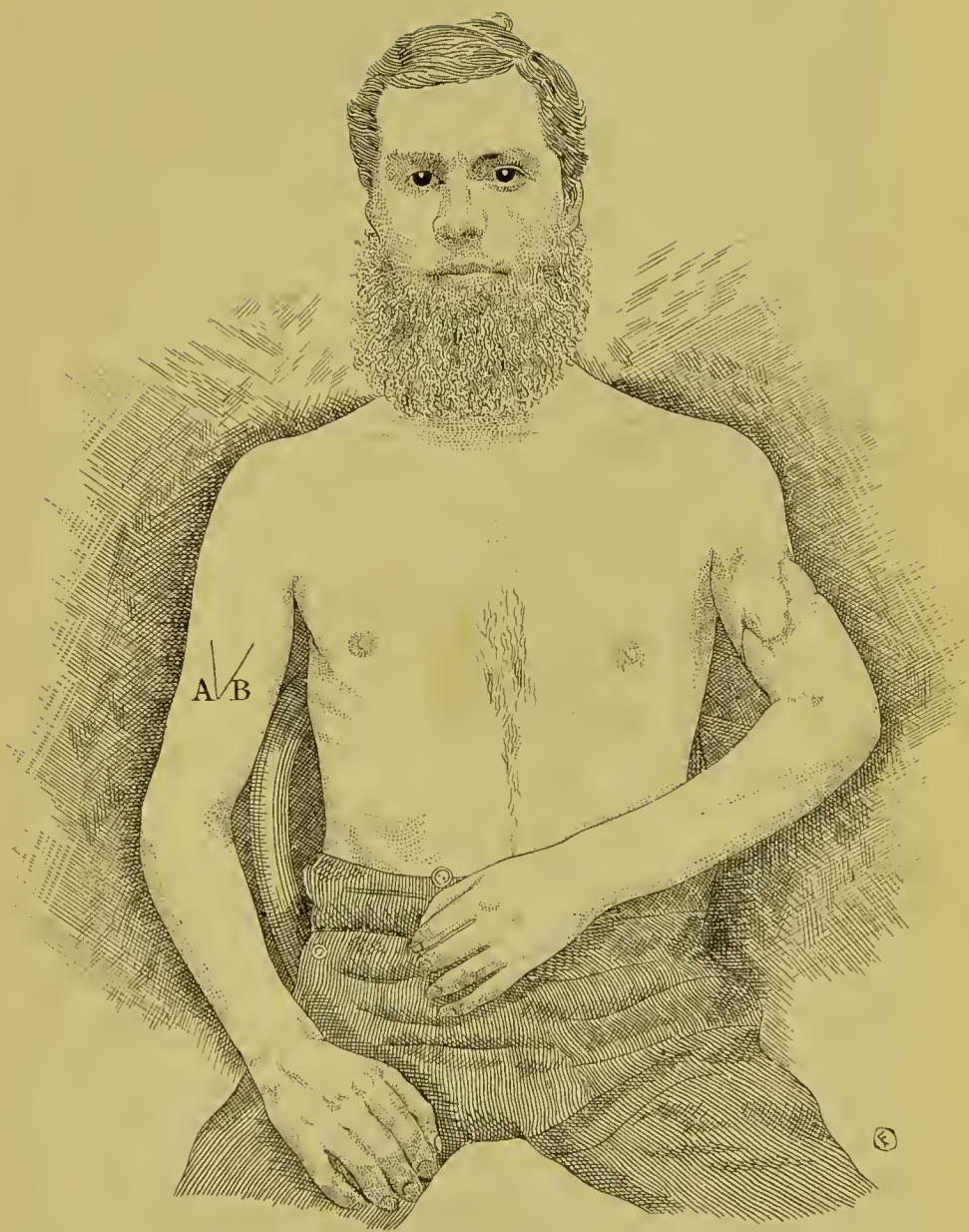
* The practice of giving children, who have been weaned, milk and other liquid forms of food to quench thirst between meals, is a common example of feeding too concentrated.

patient's dietary is regulated so as to task the weak portion as little as possible. This "Contribution" concludes my offerings to the Institutes of Surgery and Medicine. If it should be discovered that I have added an atom of information to the principles, it will give me much more satisfaction than if I should succeed in further burdening practice with ingenious means. There may be many ways of attaining a purpose, but a principle, if correct, has not several faces.

It is my hope that the suggestions which I have tried to convey may be found, in the main, correct, and may enable surgeons to treat their cases more and more truly antiseptically, by enabling them to gain their purpose without so often making a breach in the body, hermetically sealed by the skin. Even tenotomy, simple and safe as we know the operation to be, is not without its risk. The rules I follow, have enabled me to gain my purpose quicker and safer in most cases of deformity without this operation. The same rules have lead me to a successful mode of treating lesions of the skeleton, so that, while improving defects, it left no qualifying trace of the treatment, which is more than can be said of our major operations for the relief of deformity and diseases of the bones. Operations, if at times proper and a gain on the whole in comparison with the antecedent condition of the patient, leave a qualifying defect, consequently, any knowledge that will enable us to oftener dispense with them will be welcome,

*Read
June 28/86*





Case of Geo. Davies,
CONDITION OF LEFT ARM TWO YEARS AFTER OPERATION.



Case of J. W. Jones.

WISCONSIN U. S

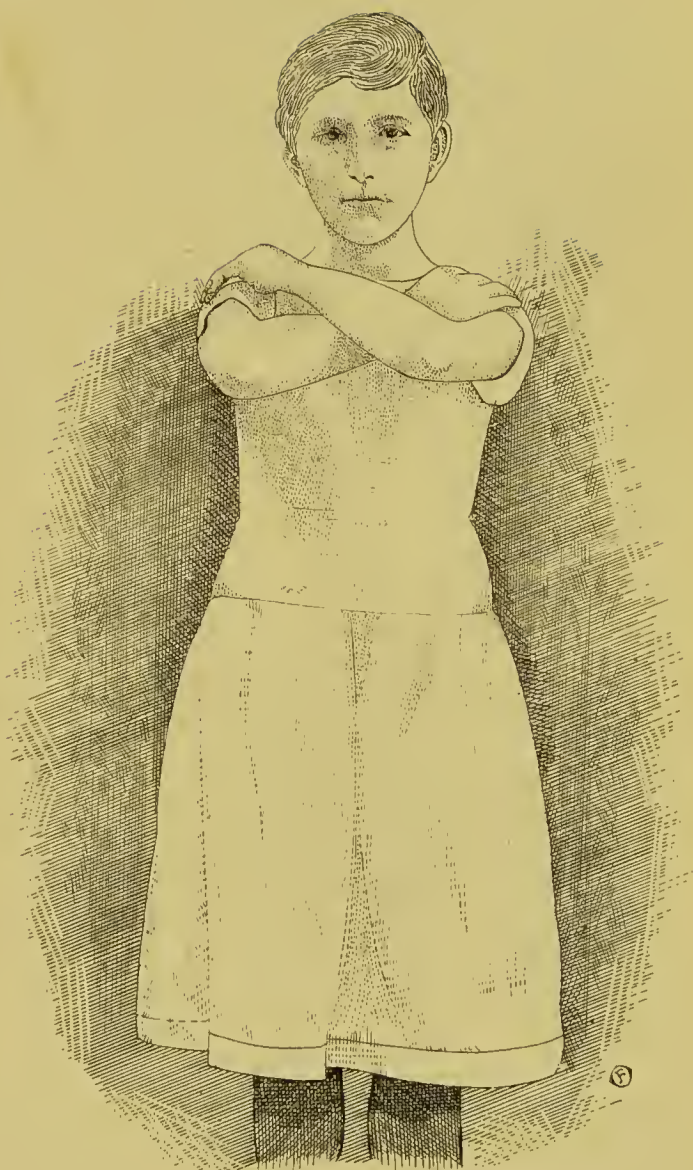




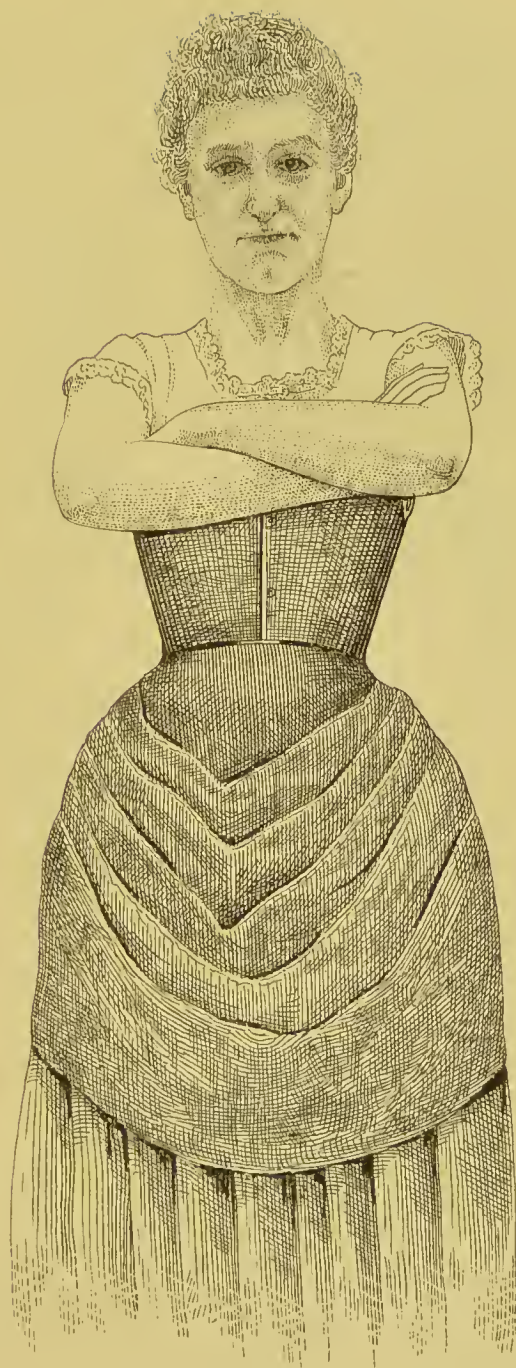


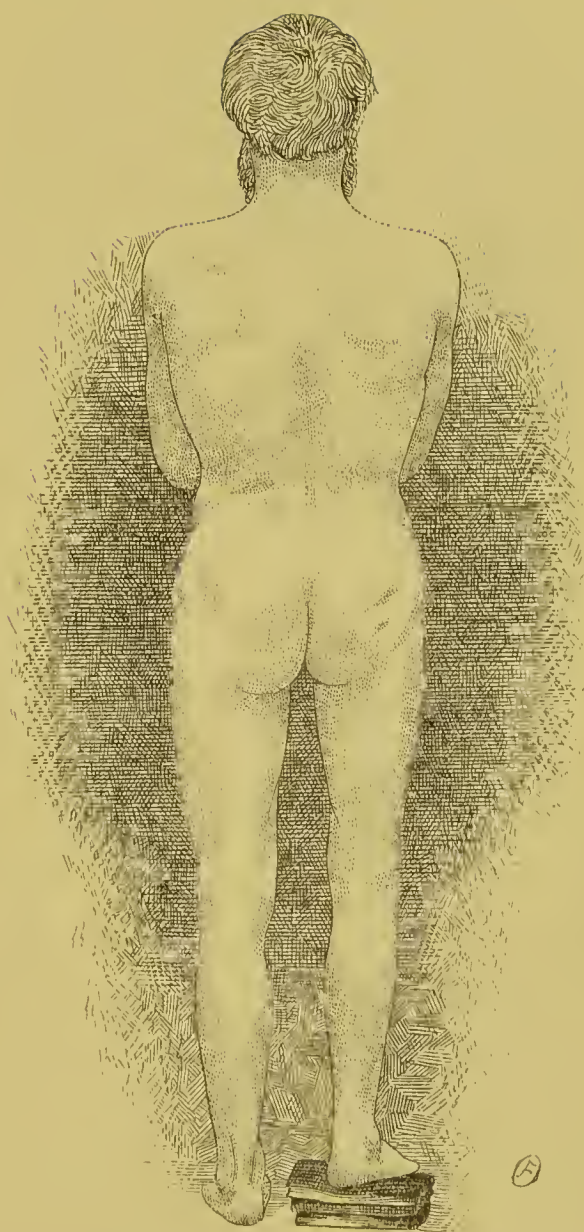


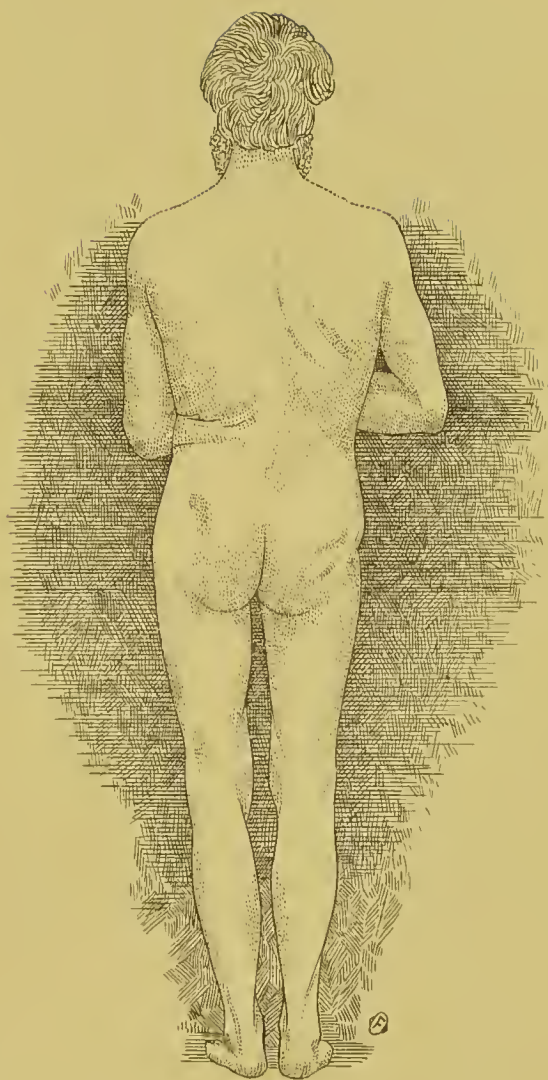




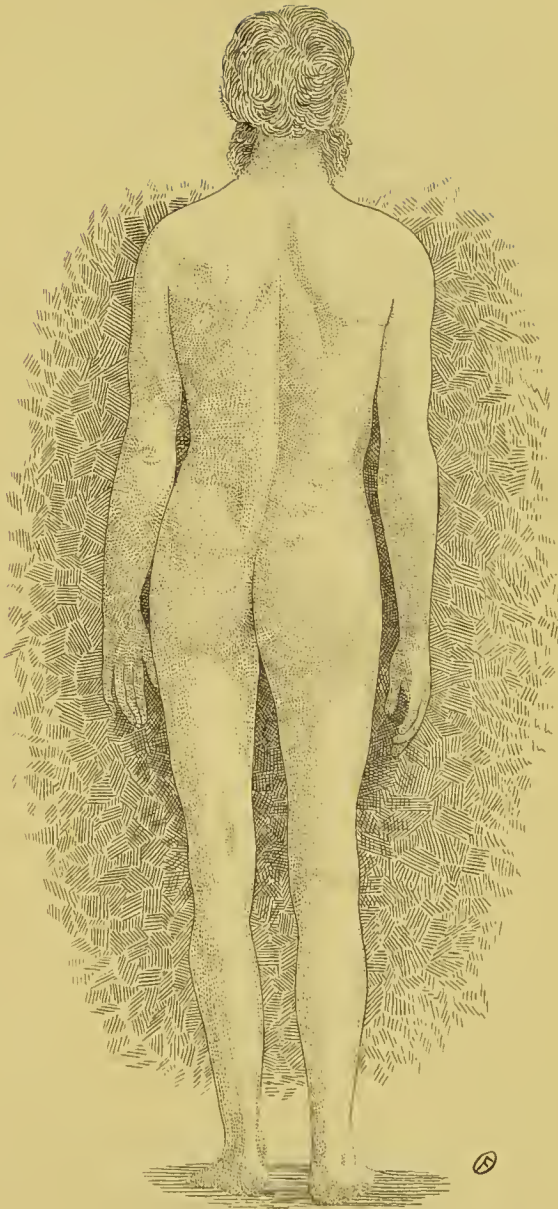




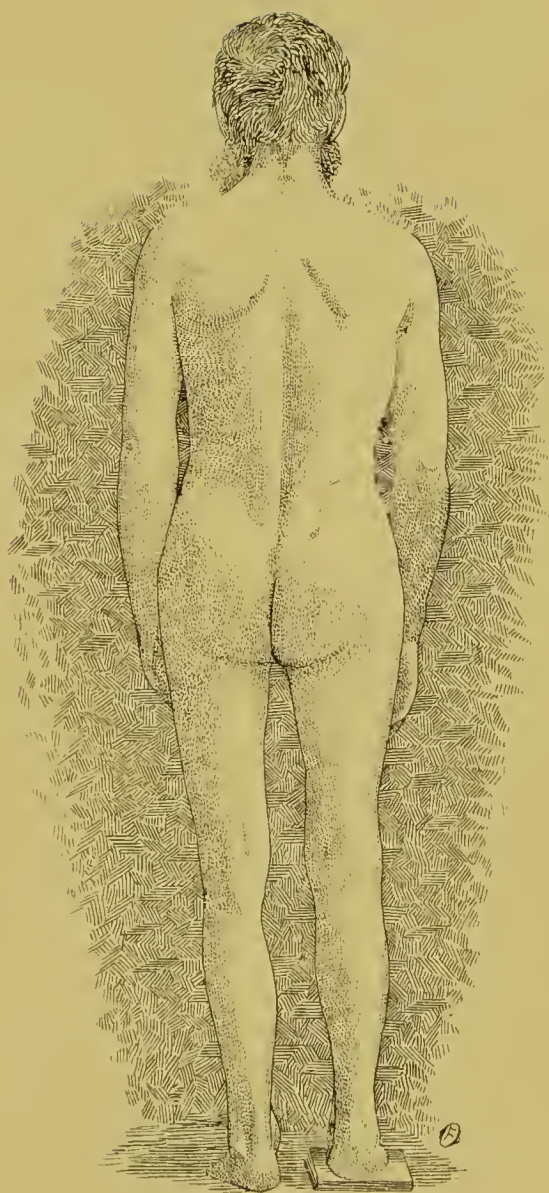












Part V.

September, 1881.

THE TREATMENT
OF
Fractures of the Lower Jaw,

BY

HUGH O. THOMAS.



LONDON :

H. K. LEWIS, 136, GOWER STREET.

TREATMENT

OF

FRACTURE OF THE LOWER JAW.

SEVERAL years have elapsed since I began to practise the following method of treating compound fracture of the lower jaw. Since the first publication of my pamphlet on this subject, I have operated upon an average of six cases annually, and am more than ever convinced that the method in question is a decided improvement upon prior modes of treatment. The additional cases which have thus come under my notice, have enabled me to devise and practically test some varieties in the mode of its application, and to further improve and also simplify the mechanics of the treatment. My entire experience of this method, has convinced me that it can be more easily and quickly applied, and with less irksomeness to the patient, than any hitherto proposed; and I am so convinced of its superiority that I believe it has only to be known to be adopted, and to supersede the complicated and painful appliances hitherto in use.

It is not necessary for me to enter into the merits of the numerous methods now in practice, the mechanics of this injury having been so well illustrated by Hamilton, Packard, and Heath. I make no claim to originality in the use of the metal ligature in fractures of the jaw, as it has been used

—though only in exceptional cases—by Dr. Buck, of New York, in 1847; Kinlock, of Charleston, 1859; Hamilton, of New York, 1858; and Mr. Wheelhouse, of Leeds, 1864. In 1863 I first operated successfully, using the plan here detailed, in a case, related further on, where a portion of the lower jaw, including two incisor teeth, had been removed by a direct blow from a capstan bar. Since then I have uniformly practised this plan.

The instruments I now use, are the following:—

Fig. 1, Pl. 1; the “Handbit,” with cutting edges, right and left.

Fig. 2, Pl. 1, shows the cutting edges; fig. 1 exhibits the cutting edges with the right and left “angles of relief.” The bit should have one-sixteenth of an inch diameter, and be three inches in length of stem. The hole drilled by it will thus allow one twenty-fourth of an inch silver annealed wire to pass easily.

Fig. 3, Pl. 1; the Key for coiling the wire ends, with slit. The slit should be wide enough to receive the wire easily, and should widen slightly towards the extremity. This key is cut out of a one-eighth inch steel rod.

Fig. 4, Pl. 1; The tube, with oblique orifice, to receive and guide the wire, when withdrawn through the bone or between teeth.

Fig. 5, Pl. 1; the watchmakers’ broach, to broach between teeth. It is well also to have at hand a similar broach, bent to a right angle at half-an-inch distance from the point.

The wire used should be full $\frac{1}{32}$ inch silver annealed wire; a stronger cannot be manipulated with ease; and wire less than $\frac{1}{32}$ inch would not set or retain its coil, but would soon become loose. To make certain that this wire will retain its coil, the key must not exceed one-eighth of an inch in diameter. If a thicker wire were employed, the coil made upon it should be proportionally larger; but a large coil is very inconvenient in the mouth.

I recommend this operation for compound fractures only, of the lower jaw; meaning by compound fractures, those in which the periosteum and surrounding tissues have been lacerated, and allow some degree of primary displacement. Simple fractures seldom require the aid of the surgeon.

Having applied, in the early part of my practice, the wire ligature with the ordinary tie or cross-twist, I could not avoid noticing that, however firmly the fracture might be fixed at the time of operating, it became relaxed on the second or third day. As the wire, when cross-twisted, will not bear the strain of several subsequent twistings without breaking, I was sometimes necessitated to make a second application with fresh wire. This further manipulation, at a stage of the treatment when the parts are so sensitive to pain, was often objected to by the patient. To obviate this difficulty, I devised the method of securing the wire by coiling its ends, which is detailed in the following cases. These coils the surgeon may tighten, and thus maintain correct replacement of the parts, as

often as he judges the case demands, without pain, and in a few seconds of time.

The various methods of applying the wire will be found detailed in the illustrative cases.

There are a few points of special practical value which should be borne in mind, for without attention to them, no amount of careful and efficient mechanical treatment will give rapid and successful results.

First, it is not well that the operator should strive after great nicety of adaptation during the first three days; absorption, diminished tumefaction, and consolidation of the parts assist replacement at a later period, without much effort on the part of the surgeon. Again, the line of fracture will sometimes be found to have passed through one or more of the dental sockets. In this case, a tooth will require to be extracted from the extremity of one, and, in some cases, both of the fragments, or correct replacement will hardly be possible, and union of the fracture may be not merely delayed, but prevented altogether. The position of the tooth which usually requires removal is illustrated by that marked D in Pl. 5. The root of this tooth will be observed to cross the line of fracture, remaining attached to the "riding" fragment of the broken bone. This point is our guide. The tooth that is embedded in the "riding" fragment of bone ought always to come away.

Further, if union is delayed beyond the fourth week, *even when correct reduction has been secured*, then usually a tooth is

impeding union, and ought to be removed. In the case of vertical fracture, two teeth, one on each side of the fracture, may be hindering cure and require extraction.

When this Treatise was first published, I did not fully appreciate the great practical value of careful attention to the behaviour of the teeth in the neighbourhood of the lesion. It is now my opinion, that the mishap of non-union of the fracture in case No. 3, might have been averted. Early in the treatment of case No. 5, extraction of a tooth was practised. Even in some cases of simple fracture, where no wire operation or other surgical interference is called for, it may be necessary to remove a tooth.

I may mention a few cases which have illustrated to me very conclusively the importance of this point. I was requested to visit Runcorn, and examine a case with my friend DR. ROBINSON of that town. The patient, a sea-captain, was suffering from fractured jaw, caused by some spars falling from their attachment to the mast. I went prepared to operate, but, on examination of the patient, I found he had only a simple fracture of the left body of the lower jaw, with other severe injuries to the scalp and face. The fracture not being compound, operative interference was not required. This patient was sent for my inspection six weeks after my visit; yet, though the parts were not displaced, there was no consolidation. I at once removed one tooth, and consolidation followed in ten days.

Some workmen were taking down an old building, adjoining

which was a workshop, where a numerous staff of females were employed. The exposed party wall of this building gave way, and many of them were seriously injured. One sustained a simple fracture of the body of the lower jaw, and was, with the other sufferers, taken to a public hospital, where the fracture was adjusted. She remained an indoor patient for many weeks, and, on being discharged, consulted me, when I found excellent adaptation in line, but no complete consolidation; motion being perceptible at the point of fracture. I removed a tooth which I judged to be the cause of delayed union, with the result of securing complete consolidation in ten days.

During the latter part of 1879, I operated upon the compound fracture of the lower jaw, of a lady hailing from the neighbourhood of Limekiln Lane. During the operation, I did not consider that any of the teeth required to be disturbed; however, there being no union at the end of four weeks, I suspected that some of them were to blame for our failure. On careful examination, I found a tooth on either side of the fracture, loose and easily moveable, and when these were removed, the alteration towards consolidation was very marked in its rapidity. These offending teeth usually come away very readily, requiring but little force.

During these latter years I have repeatedly treated, by this method, cases presenting the mechanical difficulties noticed in the case No. 9. related below, namely, where a portion of the jawbone has been entirely removed; either, as in that case, through direct injury, or during operations for

malignant disease of the bone. I may state that I have found it to answer well, after section of the jaw, when practised for removal of the tongue.

C A S E S.

The first case illustrates the method of applying the wire shewn in Fig. 1. Pl. 2.

CASE I.—T. S—, while engaged in a street brawl, April 5th, 1866, received a blow on the jaw. On making an examination the following morning, I found a compound fracture of the lower jaw at the symphysis, with great mobility at the seat of injury. I prepared to fix the fracture. Having directed an assistant to steady the head, and another to evert the lower lip, I passed the drill through the bone on either side of the fracture at the reflection of the mucous membrane, care being taken not to injure the fangs of the teeth. The silver wire was then passed through the opening at A (see Fig. 1, Pl. 2). Next, the tubular needle was passed through at B, and into its open end the return end of the wire was introduced. The tubular needle was then withdrawn, and with it the wire. The object of this needle is to act as a director to the posterior opening of the aperture as at B, and to obviate difficulty and delay in searching for the entrance, from behind forwards, of the aperture. Afterwards the end of the wire at A, was inserted into the slit of the key (Fig. 2, Pl. 2) and twisted into three or four coils, the same being done with the end of wire at B, until the fracture was fixed. On the fifth day I found that the wire had slackened, and required the use of the key in one of the coils. Although either end of the wire may be tightened under these circumstances, it is generally better to choose the shorter coil, and, before proceeding to twist, we must, of course, make sure that the cross piece of the wire A is well into the slit of the key B (Fig. 2, Pl. 2). In this case

the wire required tightening every three or four days. In twenty days the fracture was firm and united. The patient, from the commencement, expressed his ability to masticate, which I did not permit. Afterwards he informed me that he had occasionally disregarded my veto in this respect.

In this situation, at or near the symphysis, the application of the wire ligature need not occupy more than three minutes. When the wire requires removal, we can introduce the key into one of the coils and unwind it, afterwards passing the key into the remaining coil, and winding up until all the wire has been coiled upon the stem of the key. Or it may suffice to introduce the key into one coil only, and wind up steadily. The coil at the other extremity will then uncurl until the wire is withdrawn and wound around the key.

CASE 2.—T. B—, a ship carpenter, was struck on the face by a piece of heavy timber, and fell seventeen feet from a working stage. On examining him, an hour after the accident, I detected a compound fracture of the lower jaw on the left side, at the situation of the first and second molar teeth, which had been removed by the force of the blow. With one exception I never before witnessed so much mobility in a fracture of this part. The remaining teeth were firm *in situ*. Agreeably to my instructions, my assistant exposed the seat of injury by drawing aside the cheek, and the third molar tooth was steadied with a piece of wood directed across the mouth from the side opposite to the fracture. Then, using the drill, a hole was bored from without backwards and inwards through the third molar tooth below the enamel, this tooth being firm in the posterior portion of the fracture. The wire was then passed through the hole in the molar tooth B (Pl. 3) from without inwards, and brought forward between the bicuspid and canine teeth A (Pl. 3). As these latter teeth were closely set in the anterior fragment of the fractured bone, the broach was used between them to enable the wire (1-32 inch) to pass. Finally, the ends of the wire were coiled with the key, an operation which was repeated from time to time as required. In three weeks there was union. After the fourth week the bone was firm, and I removed the wire. During the treatment the patient was with difficulty restrained from using the jaw in mastication.

In this case, it will be noticed, the bone was not drilled ; but, had the bicuspid and canine teeth not been firm, I should have drilled at a point between A and C, Pl. 3. The hole which had been drilled in the third molar tooth was filled with a metallic amalgam, which was easily introduced.

CASE 3.—W. T—, during a street riot, February 18th, 1867, was severely injured about the face. On making an examination the next morning, I found a compound fracture of the lower jaw, half an inch to the right side of the symphysis, and a simple fracture at the left angle of the jaw, accompanied by great swelling of the surrounding tissues. I operated on the fracture at the symphysis, repeating the method employed in Case I. The fracture at the angle was supported with bandage and adhesive plasters. On the fifth day the parts over the injured angle of the jaw became the seat of inflammation followed by abscess, and, pneumonia setting in on the eighth day, it became impossible to do much for this injury. The fracture at the symphysis was tightened at intervals, and at the expiration of six weeks it was firmly united, at which time there was no union at the angle. The patient now returned to his native town.

CASE 4.—W. H—, while at work, fell into a dry dock, March 8th, 1867, and received a severe compound fracture of the lower jaw at the symphysis. The base of the skull was also fractured, and there was a compound fracture of the arm. From the very serious nature of his other injuries, I did not think it prudent to interfere with the injured jaw in this case during the first week. On the 15th of March, the condition of the patient being much improved, on examination I found the fractured portions of the jaw separated by an interval of a quarter of an inch. They were now adapted and secured by the method followed in Case I. The subsequent treatment consisted in the usual tightening of the coils, and there was perfect recovery in four weeks after the operation. This patient made use of the jaw in mastication during the treatment, abstaining only from animal food.

CASE 5 is illustrated by Fig. 4. Captain T— applied to me on November 11th, 1867, to fix a fracture of the lower jaw. The fracture was compound, and situated between the right bicuspid and canine teeth ; there was also a simple fracture of the left ramus, from which I removed, at a later period, a portion of necrosed bone. To fix the fracture, the anterior

fragment was drilled through at B, Pl. 4, and a broach was passed between the bicuspid and first molar teeth. The wire was passed inwards through the drilled hole at B, and then backwards and outwards between the molar and bicuspid teeth. Its ends were then coiled and tightened with the key, but I could not reduce the displacement until I had removed the canine tooth, which projected between the fragments, and prevented proper adaptation of the fracture. This being accomplished, I had no difficulty in bringing the fractured ends fairly together, and fixing them. The broken ramus was aided with bandage and plaster. At the expiration of seven weeks the parts were firm and united. On the patient's recovery the gap between the bicuspid and incisor teeth no longer existed, nor was there any trace of the site of the removed canine.

CASE 6.—April 16th, 1868, J. P— was struck a severe blow on the jaw by a pugilistic acquaintance, with such effect that there resulted a compound fracture to the left side, between the first and second molars, and a simple fracture to the right of the symphysis. The molar teeth at the site of the fracture were large and firm, which induced me to operate as illustrated in Pl. 5, by the method C E. Had the simple fracture required treatment, I should have followed the method represented by A and B Pl. 5. The wire was tightened occasionally. The simple fracture was firm in three weeks. The compound fracture was united at the end of the seventh week.

Pl. 6 illustrates the case of John O'N—, who, while standing at a street corner, September 13th, 1874, was assaulted by a ruffian, and sustained a compound fracture of the left ramus, near the third molar tooth. The first and second molars were dislocated, and had been removed prior to my examining him. On the second day after the accident, when he consulted me, I found the face much swollen and tender, the remaining teeth all firm, and the third molar prominent. I decided to operate by twisting one end of the wire securely into a loop, placing this around the neck of the third molar tooth, then bringing forward the other end of the wire from within, through a hole drilled in the anterior fragment, and coiling up the wire as usual. As the fracture was deep in the mouth, and the parts tumified and tender, I could not drill the anterior fragment from within the mouth, so I passed the drill through the cheek, opposite the point marked A, Pl. 6, and proceeded to perforate the bone. I found no difficulty in so doing, and on withdrawing the drill, I introduced the tubular needle, and having passed the free end of the wire into its orifice, brought it through the jaw from within. As soon as I felt that the

wire, which I had sharpened at the point, had come through the jaw, I incised the mucous membrane and drew the wire into the mouth. I then applied the key and coiled the wire as at A in Fig. 6. On the tenth day erysipelas set in, caused by exposure while crossing the river on a very cold evening. Recovery was complete in six weeks.

The next case (Pl. 7) illustrates another variety in the application of the method.

CASE 7.—During the latter part of 1874, a gentleman of some local celebrity had a compound fracture of the left side of the jaw at the situation of the second molar tooth. I found the first and second molars absent; the third was firm in the posterior portion of the jaw, but so depressed and nearly level with the surrounding parts that no use could be made of it in attaching the wire. I therefore drilled the posterior fragment through the cheek in the following manner. Placing the index-finger of the left hand inside the mouth, slightly beyond and opposite the third molar, I was in readiness to steady the posterior fragment, and to detect when the drill should have passed through the bone; this position of the finger also assisted to indicate the point outside the cheek that I was to select. Thus prepared, I pushed the drill through the cheek, drilled the posterior fragment, and, on withdrawing the drill, entered the wire at the puncture in the cheek, and passed it on through the bone until it could be felt at the base of the tongue. I then drew the wire into the mouth, leaving about one-fourth of an inch outside the cheek, which end I bent to a right angle to avoid overdrawing it. I then stretched the cheek, and the bent end disappeared. I now introduced the finger between the jaw and the cheek, incised the mucous membrane over the bent end of wire, grasped it with pliers, and drew it forward. The anterior fragment having been drilled in the usual way, and the other end of the wire passed through it from within, both ends were coiled with the key. The coil at B will be observed to be reversed—twisted from *right* to *left*. This raises the coil to a higher level, bringing its *inferior* edge in line with the drilled foramen; whereas, the coil at A being twisted from left to right has its *superior* edge in line with the foramen. By attention to this point we will be enabled to reach deep-seated coils much more easily when they require removal.

This method, as illustrated in Cases 6 and 7, obviates the necessity for an external incision of the soft parts, and enables the surgeon to operate on any portion of the body or ramus of the jaw without the risk of disfiguring the face.

CASE 8.—T. S—, a young man returning home on the evening of December 26th, 1874, was assaulted by corner roughs, who usually supply me with cases in this department of surgery, and who, on this occasion, as on most others, operated with such success on his head as to inflict, among other injuries, a compound fracture of the lower jaw between the bicuspid and first molar tooth of the left side. The second and third molars were absent, the remaining molar was firm and very prominent. I operated by the method shown in Pl. 8; passing the wire from without through the drilled anterior fragment and drawing it well into the mouth; then passing the same end again inwards, so as to form a loop, with which I encircled the crown of the first molar, and coiled one end of the wire without, and the other within, the jaw. I found this operation very easy, as the same end of the wire could be passed twice inwards, requiring no tubular guide needle. Had this variation of the method occurred to me at an earlier date, I should have practised it in Case 2 and some others. In this case consolidation was complete in four weeks.

CASE 9.—The last example I shall report was, with the exception of case 7, the most severe injury to the lower jaw that I was ever called upon to treat. The sufferer, McLeod a rigger, was engaged with several others in "docking" a large ship, known by the name of "Bates' Family," when the strain upon the capstan overpowered the men, and two were severely hurt; McLeod being struck with a capstan-bar on the front of the jaw, with such force, that the centre portion of the jaw bone, including two incisor teeth, was removed. He was taken to an hospital, where he remained almost three days, and nothing being done, he came home, when I was called to see him. On examination, I found that the tumefaction of the surrounding parts, combined with the displacement of the fragments, rendered the jaw and teeth almost invisible. I was puzzled for a while what to do in the way of aid. It was in this case that my method of using the wire ligature was first tried, and the man made an excellent recovery with little perceptible deformity. The plan followed was that shown in Pl. 2.

Among the advantages of this method I may point out the following.

It involves no outward applications, of bandage, plaster, etc., which are so unsightly, and wearisome to the patient.

No interdental splints, of metal, vulcanite or so forth, are required; thus the Surgeon is independent of the dental or other mechanician. Such splints incommode through their bulk, and materially increase the foetor so repulsive in these cases.

The patient can articulate sufficiently for ordinary purposes, and is enabled to follow his business.

The wire when thus used is, in most cases, quite out of sight.

The patient can take food easily, and can wash out the mouth with lotion or warm water frequently and efficiently.

PLATE 1.

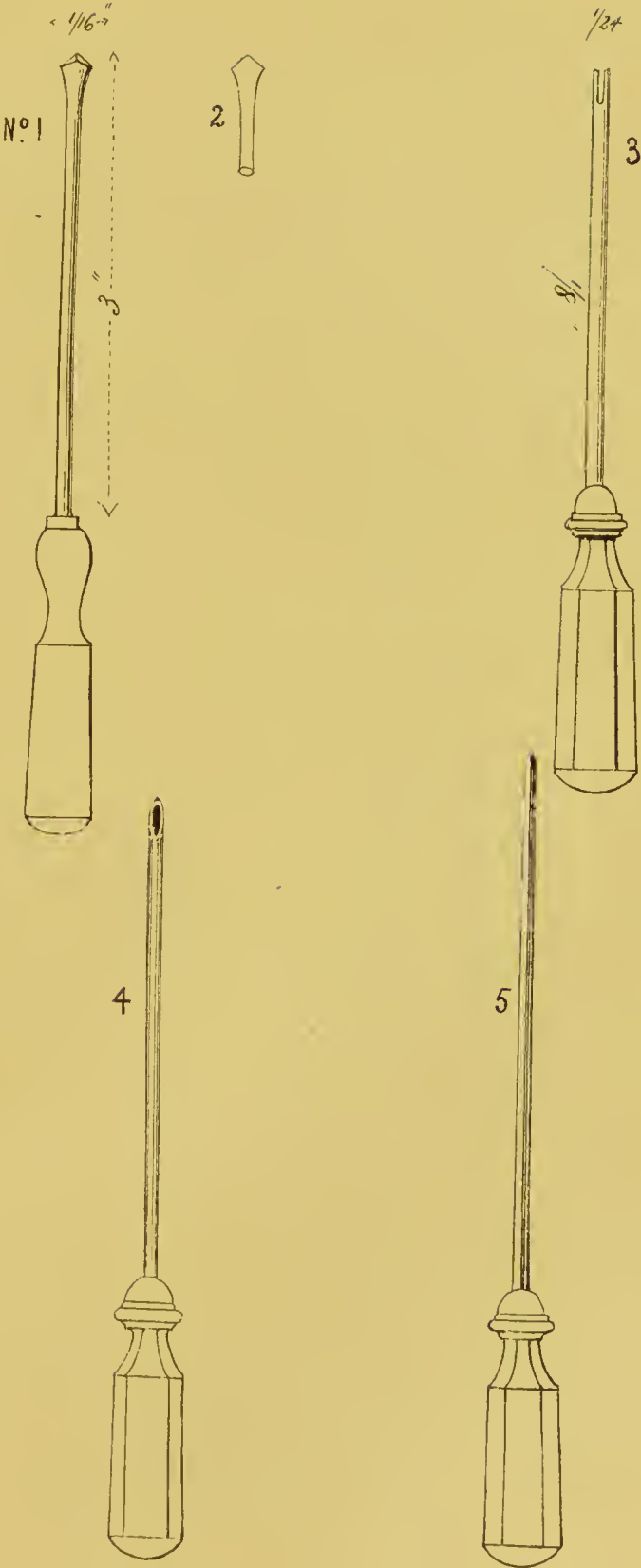


FIG. 1.

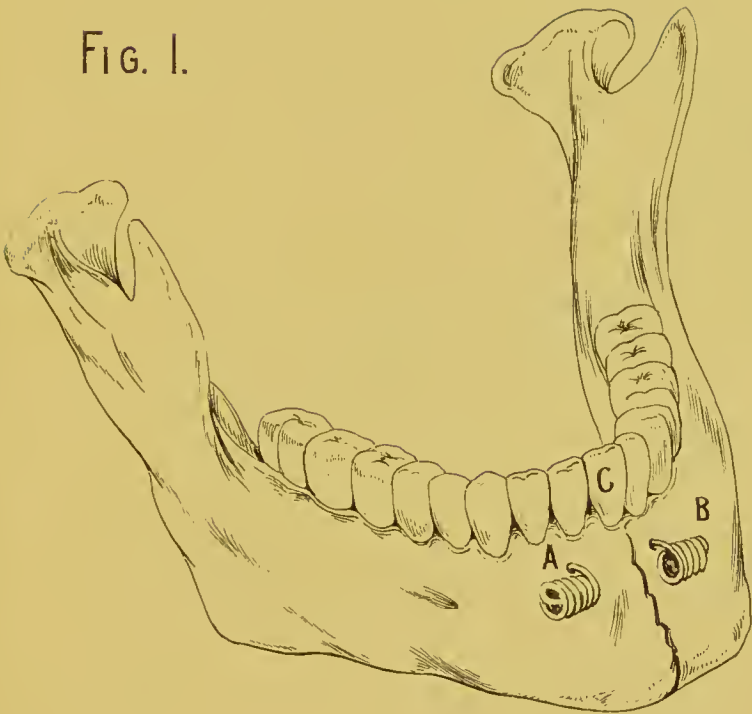
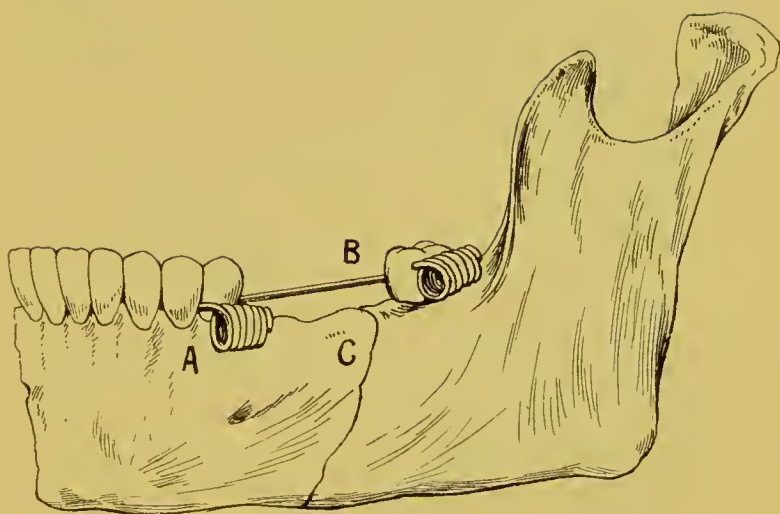
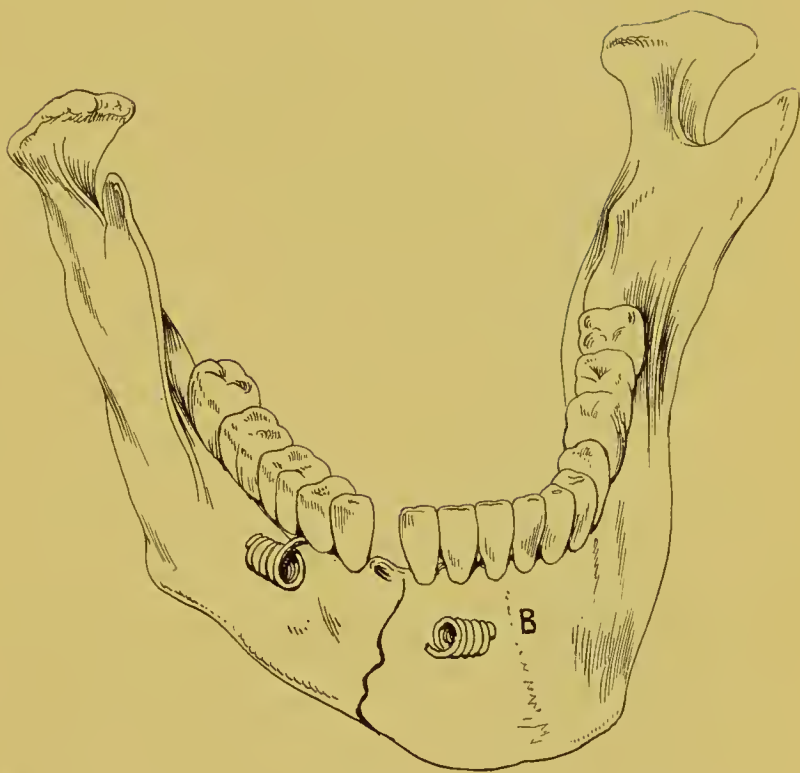
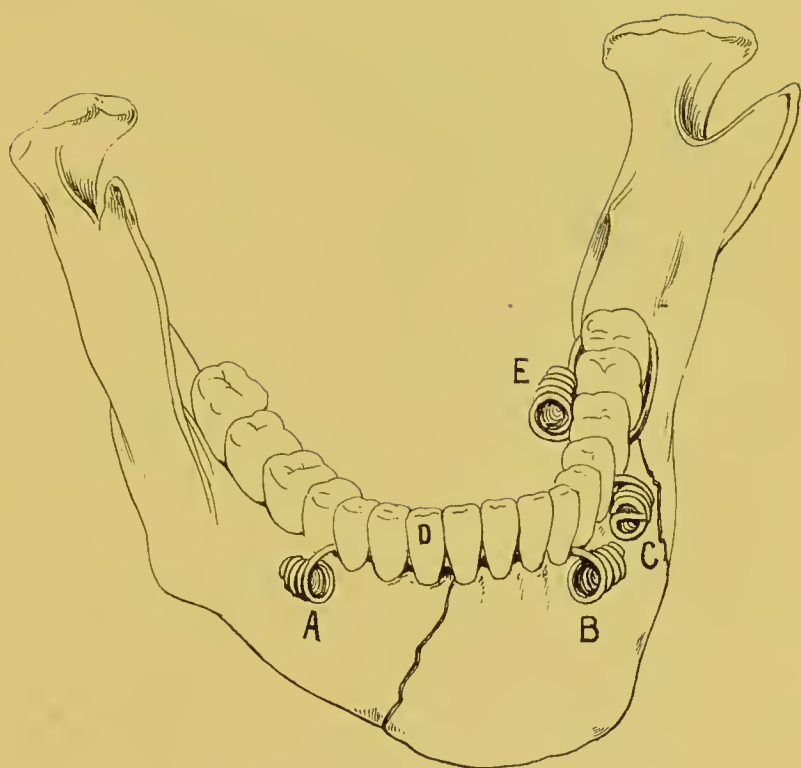


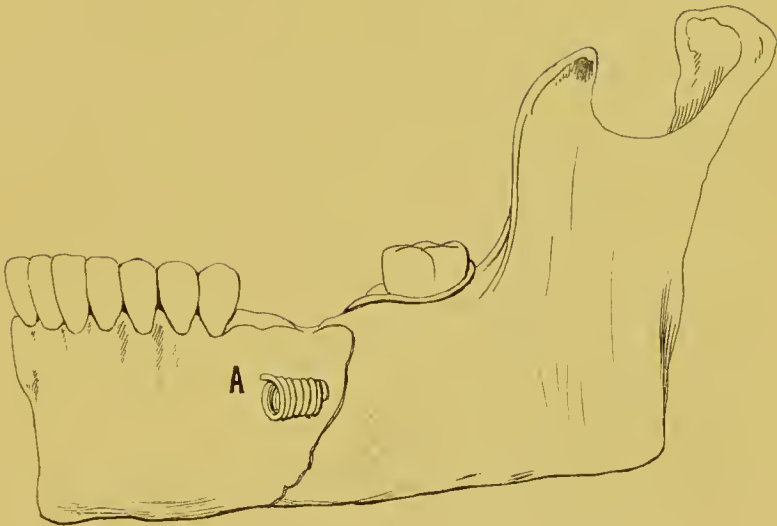
FIG. 2.

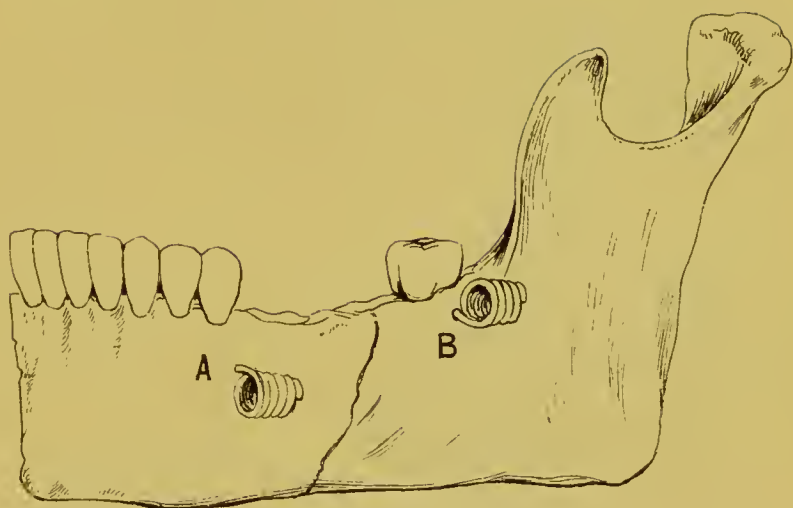


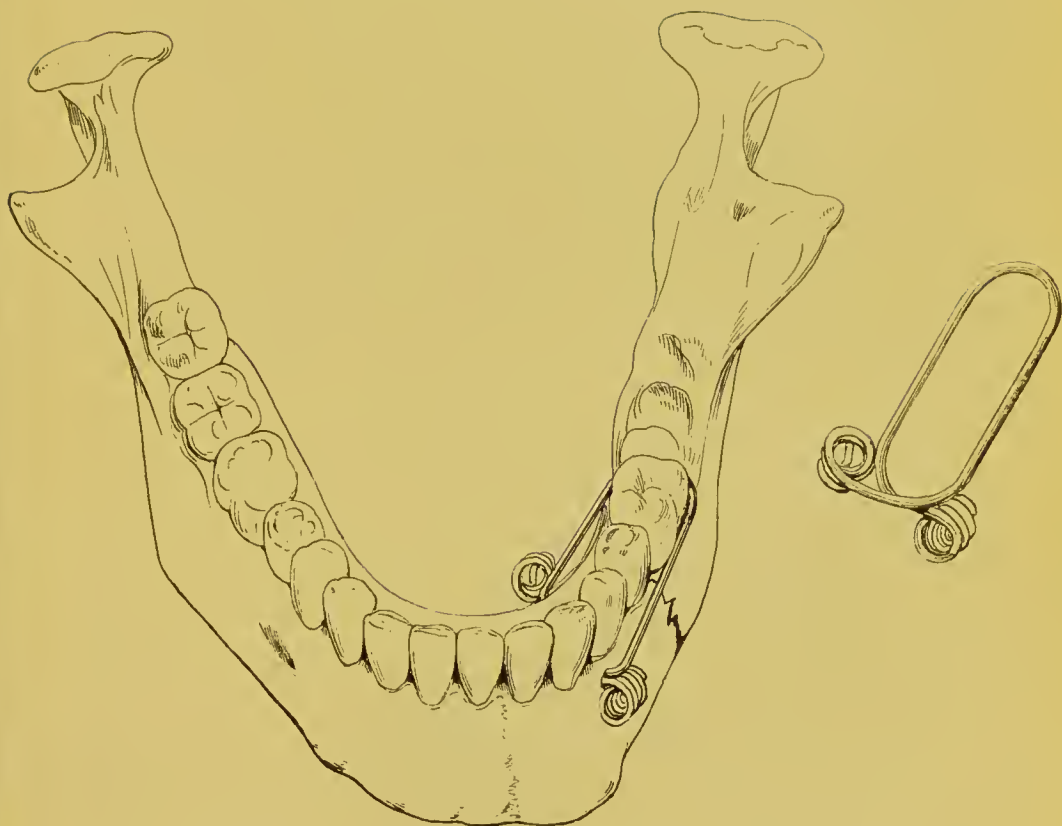












Bernard Roth

read Jan 12. 1887.

CONTRIBUTIONS

TO

SURGERY AND MEDICINE.

Fractures of the Neck
of the Femur,

BY

H. O. THOMAS.

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FRACTURES OF THE NECK OF FEMUR.

IN the number of this Journal issued Oct. 12th, 1882, my views and experiences regarding the principles, which ought to guide surgeons in their treatment of fracture of the patella, were given to your readers. Since that time the subject has been much debated before several of our societies and discussed in our periodicals. The information, supplied me from this source, only shows the general poverty of knowledge in relation to the treatment of fractures of the patella, for, of all the gentlemen who joined in the debates or contributed to the literature of the subject, not one was able confidently to recommend a rational and trustworthy method of treatment; thus it is not surprising to find the majority of those, who expressed their opinions, hailing with undisguised delight the proposition that patellar fractures, whether they be simple or compound, should be treated by the knife and drill,

It would be interesting to know, if it were possible, how many of those, who so readily approved of this proposal, would, if suffering from the accident, submit themselves to such treatment. I have of late years maintained, and, from my experience up to this date, am more than ever convinced, that, whether the fractured patella be complicated by a wound or not, interference by knife and wiring will not give as good and safe results as can be gotten by a natural method of cure, if the surgeon knows how to aid it or at least not thwart it. There are principles of treatment which, if carried out in practice, will enable the surgeon to dismiss his patient with, at least, a useful limb, and in the majority of cases with a faultless cure.

The evils, which our past and present practice up to this time have failed to avoid, are these : the patient might after treatment be unable to extend his leg properly, or, when standing, to maintain his thigh rigidly in a line with the leg, or there might be an excess of mobility with deficiency of power. These remains of the

accident can be avoided, as I have shown in the paper mentioned above.

This contribution to the treatment of fractures at the neck of the femur has been prefaced by the foregoing remarks relative to patellar fractures, because, in giving my views of the theory of treatment, proper to fractures at the neck of the femur, reference must be made to principles which, I maintain, apply equally to the treatment of fractures either of the patella, neck of the femur or of the olecranon, and here are repeated the views, given in my former paper in this journal, that the treatment either of these or any other fractures, or of diseased joints, is not mainly a question of mechanics. It is time enough to begin inventing splints when we know with some certainty what we ought to be doing to gain our purpose, then we will be better able to decide upon the best form of mechanical aid to treatment. That some of the machines, usually employed in treatment, have advantages, which aid us in the carrying out of certain principles is as obvious as the fact, that other

machines may be positively injurious, if these same principles ought to guide us during treatment. Of late years, there has been a surfeit of inventions, the construction of which demonstrates that their inventors had no knowledge of the treatment that ought to be followed to secure a perfect recovery. Mechanical ingenuity cannot supply the place of intelligence. It is my contention that there is a rational treatment which, if adopted, leads to success in fractures of either the patella, olecranon or neck of femur, though the mode of application must vary to suit the variation of form at the three different parts.

In the treatment of fractures of the olecranon, the mode of carrying out the principles of practice here recommended is very simple, as no special appliance is required to gain our purpose. The limb has merely to be maintained extended, or nearly so, by any method that does not involve, in its application, compression on any part within about two inches either above or below the elbow-joint, for a period long enough

that firm and sound consolidation may take place. The only exception to this rule is in those cases, where the fracture of the olecranon is compound and invading the elbow-joint, when the position of flexion ought to be maintained during treatment, lest the injury may run a course ending in the loss of motion at the joint. The risk of the lesion being cured with some defect of symmetry, must be incurred in order to make certain of gaining a useful result. Olecranon fractures do not cause to the surgeon so much anxiety as those of either the patella or neck of femur. Fractures of the patella happen most frequently during the prime of life, when the sufferer can ill afford to be crippled, whilst fractures of the neck of the femur most frequently occur in the decline of life; and here again it is a very pitiful thing, if the sufferer must forego the enjoyments of what he had secured for himself in earlier years, by being either constrained always to use crutches, or remain in seclusion, and in most instances his repose at night is interrupted by pain—which must somewhat cur-

tail the duration of his life. Can any treatment not generally known help us to avoid these evils? Certainly.

Those of my readers, who have not passed many years in the profession, may perhaps think this picture, representing the imperfections of our past treatment of fractures at the neck of femur, as being much overcoloured; but those surgeons, who have had many opportunities of observing these injuries, must know that the evils here detailed are not exceptional terminations when the hip-joint has been subjected to injury, even though there be no fractures. I am not ignorant of the fact, that some cases of fractures of the patella, olecranon, and *neck of femur* sometimes do recover perfectly, without any treatment whatever. Such cases only go to show that the other cases could, if we knew how, be made to recover also. If none of these fractures had ever been known to recover spontaneously, then we would be justified in concluding that there was in these fractures no tendency to such repair, and the experiment of direct interference would be excusable.

The unprofitable results, observed after the treatment of these three fractures, are only similar to unfortunate results, after the treatment of other bony parts, which are known as delayed and non-union. Our indifferent success in the treatment of the three forms of fracture, here referred to, partly arises from the fact, that these fractures are much more prone than others to have the development of consolidation arrested, and that surgeons have not hitherto allowed for this fact, nor directed their treatment so as to physiologically favour the reformation of sufficient amount of sound connective material between the separated parts. Our failures ought to be credited to, and can be shown to arise partly from, defective treatment.

For the guidance of the surgeon in the treatment either of fractures or of simulated fractures of the neck of the femur after injury to the joint, the following rules, which are trustworthy, may be recommended. If adhered to, the practitioner can in all cases promise his patient, that he will so far recover as to be able to indulge in walking

exercise without artificial assistance, and that he will also be free from pain.

That my readers may better understand the principles and practice here advocated, they may require an explanation of my statement, "For the guidance of the surgeon in the treatment of fractures or of SIMULATED fractures of the neck of the femur after injury to the joint." This refers to two forms of injury to the hip-joint, one in which fracture of the neck of the femur exists, and can be diagnosed immediately after the injury—or some few hours after; the other injury is that following an accident, and when there is not a fracture, but after the lapse of some time—generally after the second week many of the signs of fracture appear; shortening, eversion of the limb, limited motion, and the deformity of flexion, demonstrable by the flexion test. This differs in no manner from the signs of inflamed hip-joint, which indeed it is, and which can be diagnosed as not a fracture of the neck of the femur, by the surgeon placing simultaneously the palms of his hands upon the patient's

trochanters he will notice that, in fractures, the trochanter of the defective limb is slightly more full, prominent, and sometimes higher up than that of the sound side. This differential diagnosis is not of much practical value, as the details of treatment are nearly alike, whether there be fracture or not; if there be no fracture, the omission of retentive extension is not a fault, but indeed where fracture exists, a retentive extension is not always possible of being safely applied.

When called to the patient, he should at once fix the joint in a line with the trunk, as immovable as possible, so as to minimise the coming or present irritation of the joint, then apply any form of retention which will keep the limb at, or as nearly as possible at, its normal length, and let any bandaging that may be employed be wound in a direction the reverse of the external rotation observed in these fractures. The patient must be limited to a diet with the least possible ingesta lest the patient's limb be disturbed during a movement of the bowels in the period of greatest pain,

and when he is utterly helpless. The bowels will infallibly act spontaneously, if the diet has been properly selected (milk especially being excluded), at or before the termination of the third week, and at this time the patient will be able to assist his nurse, and movement is less injurious to him. The limitation of diet need not continue after the second spontaneous action of the bowels.

The mechanical treatment must be continued, in patients beyond the age of 70, for six weeks after the *total cessation of night pain*, when the patient must spend a further period of four weeks in bed without *any control or treatment whatever*. In patients passed the age of 60, but under 70 years of age, the mechanical control should be continued for eight weeks after the *total cessation of night pain*, and there must be another four weeks of reclination in bed without surgical restraint. The younger the patient the longer must the mechanical control be continued. The duration of the periods of surgical control here laid down may appear rather indefinite and long; but the game here is always worth the candle. Some cases

may recover with less control, but what best conduces to make the surgeon's reputation is, not a report of isolated instances of rapid recovery, but, that he has always been able to benefit his patients. Fractures at the neck of the thigh-bone are extremely rare in the early period of life, but they have been noticed even at the period of childhood, and when recognised, should be treated as a mild case of inflamed hip-joint. If there has been delay in resorting to proper treatment, as the surgeon is not always called to the patient's assistance immediately after the accident, the average period of each stage of treatment here laid down, ought to be somewhat prolonged. Should there have been even two or three years delay, the surgeon can, by following the rules here laid down, make the limb painless and useful.

The minutiae of practice, which I employ, can best be detailed by a sketch of a few suppositious cases, which, nevertheless, are counterparts of actual ones.

Case A., aged seventy, makes a false step, when coming down the stairs of his house, and falls on his right side, immediately feels intense pain in the groin and down the thigh, is incapable of recovering the perpendicular position, and objects to his attendants making any attempt to remove him to bed. On my arrival, an examination of the region of the hip-joint and of the lower limb convinces me that there is a fracture of the femur at its neck, there is eversion with no power of inversion, tenderness on pressure at the groin, no shortening. I request that the patient be left where he was found after the accident, while I fetch suitable appliances; these are the posterior support and retentive extension always adopted by me in the treatment of diseased hip-joints and of fractures at and immediately below the trochanter. As soon as these are at hand, the patient is carefully undressed, the splint fitted, without the shoulder straps, and the retentive extension is attached above the knee and tied to the lower horns of the hip-appliance. The knee and thigh are now bound to the upright of the saddle, the bandage being wound round in the direction of inversion, and the top ring of the saddle is fitted and tied, after which the patient is removed to bed, on a first floor if possible, though, when all this has been done, it is easy to take him up to a second floor without causing much pain. This is done by one attendant placing, in the case of the right limb being the injured one, his left hand under the upright of the saddle just below the knee, while with his right hand he grasps the left leg of the patient, a second attendant

supports the sacrum, and a third grasps the top ring of the saddle opposite the sternum and carries the trunk portion of the patient, who is now placed in bed--which should be a feather one or made of some material that does not form a very hard mattress. After this the person who is to nurse the patient is shown how to use the bed-pan when required, so that the patient may not be much pained nor further injured. When there is occasion for the use of the utensil, the mode of assisting the patient is thus:—the attendant stands by the bed-side and, passing an arm under the lower end of the hip-appliance and a corresponding part of the sound limb, raises the lower extremities and pelvis of the sufferer to any height that permits of the bed-pan being slipped under. This position, which is that of an incline from the feet to the head, if in any way advantageous, can be easily maintained until the act of nature is complete. After *practically* demonstrating this to the attendant, I give some instructions relative to the quality of food to be used, and that the patient must be inspected occasionally to avoid bed-sores; further, should the linen under the patient become moistened or stained by excretions, that any such offense can be removed by the method used to pass the bed-pan under the patient. The same plan can also be resorted to when dressing any bed-sores that should form. The parts where bed-sores are prone to appear are over the sacrum and at the upper ring of the saddle; if they appear at the latter part, then they can be dressed by rolling the patient over on to the

sound side, by grasping well the hip-appliance and limb between the two lower rings with one hand, and the *patient's shoulder* with the other hand, when the operator has complete power to roll the whole body, which enables him to turn the patient over without any twisting tendency, as the lower extremity and the trunk go over in line, and thus any damage to the fracture is avoided. In this case A, the appliance was put on while the patient lay just where he was found after the accident, for had he been carried unprotected by surgical fixation of the part, it would almost certainly have been more deformed and extreme shortening might have followed, whilst immediately after the accident there was none. A is a typical case, but there are to be met with cases presenting special difficulties, yet they are no bar to useful recovery, but may make recovery with no defect impossible. For instance—B.—Suffering from fracture of the neck of the femur. When the surgeon examines the limb he finds it closely mapped out with varicose veins; in such a case it is not safe to trouble about the length of the limb, as aged people, with this defect, are very intolerant of the means used to form a retentive extension dressing: In such a case, the shoulder-brace must be substituted, otherwise the machine would slip downwards. The treatment of recent fractures of the neck of the femur do not present any difficulty to those surgeons who can fit a hip-apparatus, suitable for the treatment of inflammation of this joint, but when the surgeon is called

upon to treat cases of fractures that have failed to recover, and both painful and useless—cases that may have been in a non-healing condition one or more years—then the attempt, made by the surgeon to rectify the part, requires some care for the first three weeks, the patient having really to undergo *the process of the reduction of deformity*, as though there had been no fracture originally, treated as if it had been primarily one of simulated fracture of the neck of the femur, and the length of the limb ignored. During these three weeks the patient suffers some aggravation of pain, but it rapidly passes away as soon as the limb is in line with the trunk; to avoid much pain and not dispirit the patient, the reduction should be allowed to progress slowly, as success is certain. The cases of simulated fracture of the neck of the femur require the same details of treatment as fractures of the femur neck, with this exception, that retentive extension is not used, but in its place I employ the shoulder-brace. Cases of injury, simulating fractures at the hip-joint, are very frequently misinterpreted, and are rarely relieved except by mechanical treatment. Experience has shown me that these cases are very amenable to recovery when efficient mechanical control is applied to them. The hip saddles referred to in this contribution as used by me are made by a mechanic in my employ, but those surgeons who would wish such appliances can get them from Mr. Critchley, 88, Upper Pitt Street, Liverpool, who supplies a cheaper and better model than any in the market.

Case C., while passing along a street, the parapet of which was rather narrow, was knocked down by a youth (who carcered against him), and fell on to his left side ; with some effort and pain he rose up, but found he could not proceed home without help. A sympathizer hailed a cab, in which he proceeded home, where he had to be assisted to undress and helped into bed, and his medical attendant was sent for. On examination of his joint and limb, it was found that there was no shortening, despite the efforts he had made since the accident, slight eversion, pain both on pressure of the groin and on rotating the limb, also the power of eversion and rotation was diminished. An opiate is prescribed, and the patient is directed to remain quiet, no local application. On the second day no variation of the sensational or obvious symptoms, a cloth damped in cold water is applied over the hip and groin. The patient was watched for nearly two weeks, when he began to complain of rheumatism in the joint at night ; the joint was now tested by the flexion test and a deformity noticed. Now the proper interpretation of the feeling which the patient attributed to rheumatism was given to him, and the importance of so treating the lesion that the condition resulting from the accident might not become permanent. About the fourteenth day after the accident a posterior hip-appliance was fitted, which, for the first forty-eight hours, rather increased the symptoms and also caused some amount of lumber pain—all of which gradually wore off. The surgical restraint was continued six weeks after the cessation of night pain, in all eight

weeks, and then removed, but the patient remained four weeks longer in bed, after which he got up, and with the aid of moderate exercise, taken by the use of crutches, was perfectly well in about eight months.

It has often occurred that uncured cases of simulated fracture of the neck of the thigh-bone, have led to diversity of opinion among the surgeons, whom such sufferers from "time to time"⁴ have consulted, the difference of opinion arising as to the primary nature of the lesion. The opinions of those consulted later on being seldom in accord with the diagnosis of the surgeon, immediately called to the sufferer after his accident, who fails to find a fracture, which does not exist, but the other surgeons, afterwards finding some symptoms which follow fracture in connection with the hip-joint, generally suppose the delayed recovery to be due to non-union of the fractured bone. Some years ago such a case was* the subject of a lawsuit, and the surgeon was successfully prosecuted for erroneous diagnosis and mal praxis.

* In the United States.

In after years, the prosecutor died, and by a *post-mortem* examination of the joint it was found that there had never been any fracture of the neck of the femur.

The cause of our failures to succeed in producing useful cures after fractures of the patella, olecranon and neck of femur have been ; (*a*) that, even when the treatment has been correct, it has been suspended before the parts immediately and secondarily affected have regained health and its accompaniment strength, so as to be equal to the strain of use ; (*b*) that practice of compressing the seat of injury interferes with its nutrition ; the mistaken notions founded on the pathology of the parts after treatment in past time, have dispirited surgeons from striving at better results.

CONTRIBUTIONS TO MEDICINE

AND

S U R G E R Y.

This Volume will comprise the following Parts:—

- PART 1. Intestinal Obstructions. (*Published.*)
- PART 2. The Principles of the Treatment of Joint Disease, Inflammation, Anchylosis. Reduction of Joint Deformity, Bone Setting. (*Published.*)
- PART 3. The Principles of the Treatment of Fractures, Recent, Delayed, and Un-united.
- PART 4. On the Reduction of Dislocations.
- PART 5. On Fractures of the Lower Jaw. (*Published.*)
- PART 6. Fractures, Dislocations, Diseases and Deformities of the Bones of the Upper Extremity.
- PART 7. Fractures, Dislocations, Deformities and Diseases of the Lower Extremity.
- PART 8. The Inhibition of Nerves by Drugs. Proof that Inhibitory Nerve-Fibres do not exist. (*Published.*)
- PART 9. Spinal Deformities.
- PART 10. Lithotomy.

